

VOL. 44, No. 3

MARCH 1976

CONTENTS

TECHNICAL

A Charger for Small Multicell Batteries	10
A Simple VXO	13
A Two Crystal - 80 Channel Synthesiser for 2m	16
Electromagnetic Compatibility	11
FT101 Crystal Channels	16
Inexpensive Monitor Receivers for 2 Metre FM	7
Newcomers Notebook	17
Try This	7, 17
Two Metre Solid State Transverter	5

GENERAL

A Review of the ICOM IC202	14
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DEPARTMENTS

Awards Column	23
Book Review	21
Contests	21
Hamads	25
IARU News	19
Intruder Watch	22
Ionospheric Predictions	22
Letters to the Editor	23
Project Australis	25
QSP	3, 17
Silent Keys	26
VHF-UHF — an expanding World	19
WIA News	4
20 Years Ago	25

COVER PHOTO

What is it? Some keen VHF operators will recognise it at once. Others should turn to page 15.

Photo: Ken Reynolds VK3YCY

HAM

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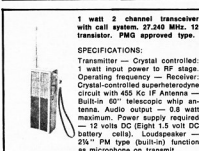
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amateur radio

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The WIA, mindful of staff shortages and the cuts that the government has made in money available for all departments, have in their discussions with the officers of the Postal and Telecommunications Department offered several suggestions — as to ways and means of assisting in the examination — or certification as qualified — candidates who wish to become Radio Amateurs.

In offering these suggestions the WIA in no way intended a lowering of the standard set by the authorities over the years.

There were different levels of assistance suggested. One was that suitably qualified amateurs could act as supervisors of exams in country areas. Another was that certain WIA conducted YRCS exams of an approved standard could be counted as an exemption for the novice exam.

Yet another was the possible use of an outside education authority such as the City and Guilds as used in the United Kingdom. To date these ideas have been rejected.

However, if the situation does not improve in the examination of candidates for Amateur Certificates in the immediate future, a campaign will be mounted by the WIA at all levels of influence.

If a campaign is launched members are asked to co-operate as fully as possible.

DAVID WARDLAW VK3ADW
Federal President

STOP PRESS

AMATEUR EXAMS ON AGAIN: FIRST EXAM HELD ON 17.2.1976

DEREGULATION

"I think we are talking about emphasising more and more the self-regulatory aspects of Amateur Radio to provide a framework of rules under which you, the amateur, can have the broadest possible latitude to pursue your own specific areas of interest wherever that might be, whether it be in CW, or it be in sideband, or it be in HF, whether it be in VHF or UHF or whatever. I think that's important and I think you, as amateurs, have to look at that carefully because each of you has different areas of interest. If there is one place this is ever evident to the Commission it's in rule-making proceedings . . . you have to tell us what you need in the way of rules . . . Now, I think we've already made some progress in deregulation . . . we are constantly devising rules to meet specific situations, and that's bad. We think you in the amateur community ought to be able to meet those specific situations. We can provide for, I think, some relaxation in the control operation rules (on repeaters). We have more under study. We have provided for interlinking of repeaters and we think that the time has come to reduce the paper work and the processing time for repeater applications.

Another area of deregulation is in the exam area and this is an area that's very near and dear to me because I think the exam area is the key to a viable amateur service. We have to maintain interest in at least a portion of the youth of this country in Amateur Radio. Now how about instant licences? We are working out details of such a system". Part of speech by Charles Higginbotham W3CAH, Chief, Safety and Special Radio Services Bureau, FCC, given at the ARRL Pacific Div. Conv. 25-10-1975 as reported in Worldradio News, Nov. '75.

TRAINING PROGRAMMES

The Radio Amateurs column in the Nov. '75 Telecommunications Journal contains an interesting insight into Norwegian methods for training to the licensed radio amateur level. LA1Q writes "It is far beyond our capacity to give private training to everyone who wants to become an amateur. Nothing could, however, be more natural in our long and thinly populated country than to make full use of amateur radio. We have therefore organised a radio course giving instruction in radio theory as well as in CW".

It acts as a normal class, he says, 4 days a week and 2 hours every day from Sept. to May and includes a final 2-week gathering with active personal

training. Writing about the disabled he says "It is difficult to reach, train and assist the disabled who want to become radio amateurs. It is made possible through the active support and co-operation of more than 250 licensed amateurs. These are scattered all over the country and are often enduring a lot of hardship to bring our services to isolated invalids". "Most disabled live an isolated life, unable to take part in normal activities. Amateur radio can overcome this isolation and be an interesting hobby, but we have to take into account that most disabled are, by the nature of their handicap, unable to attend normal radio classes. They are also generally of limited economic means and only a few can afford to buy their own equipment". A special LASQ aid fund was founded as a division of the NRRL as a project of assistance to disabled persons and works in close co-operation with their licensing administration.

NOVICE LICENSING

"The first examination leading to a 'D certificate' (Novice) for radio amateurs will take place on 26 Nov. 1975 in Utrecht" — with up to 4000 (yes, 4000) applicants at any one session. The 'D certificate' enables unlicensed applicants to accede temporarily to the ranks of legal radio amateurs and is valid for two years during which time the holder must successfully pass the examination for an A, B or C certificate. Telecommunications Journal, Nov. '75 which also includes a comment by ARRL President on the FCC re-structuring proposals that ARRL "is deeply concerned that the quality of the amateur radio service in which we take such great pride must in no way be sacrificed for quantity". (Note — the ARRL membership is over 100,000 — Ed.).

EQUIPMENT EXHIBITION — SYDNEY

A note from the United States Trade Center advises that a major exhibition of telecommunications equipment will be held from 6th to 9th April on the ground floor showroom of the United States Trade Center from 10.00 h to 17.00 h daily at 37 Pitt Street, Sydney.

REPEATER CROSSBANDING

"The FCC has deleted the restrictions on crossband operation of repeaters from Dec. 15th, 1975" is a story from QST Dec. '75. "This change", it says, "permits a repeater to have its output frequency in a different band than its input".

LICENCE FEES

Did you know that you can no longer pay your licence fee to a post office?

WIANEWS

The main topics of discussion by Executive during January were repeaters, finances and Magpubs.

Both the RSGB and the ARRL produce, print, and sell books for the amateur. This is a valuable source of income. The WIA however does not possess a profit-making undertaking. Readers should refer to the main QSP on p.3 of AR for Nov. '75.

The operations of Magpubs have been confined to processing subscriptions on overseas amateur magazines on behalf of members and acting as a sales outlet for amateur books, badges and some minor items.

Could these activities be expanded as a subsidy for reducing the Federal element of subscriptions? A careful study indicates that at this stage any expansion is not likely to attract any worthwhile for many inter-related reasons.

Firstly the storage, packing, documentation and distribution of books on a greatly expanded basis would require the provision of additional accommodation and some additional part-time assistance. If the commercial field is to be exploited this cannot be done except on a commercial scale and the provision of adequate capital to finance the operation.

It, and 'if' is the operative word, if this were to be done the tax aspect would need close examination if sales were to be made to anyone instead of being a membership service as it is now.

An important aspect would be the necessity to offset the income earned by AR from paid advertising in the same field. Only after that could the question of net profitability be considered.

Another important factor is of course the recent heavy increases in postal charges on mail order business. If a purchaser finds he has to pay in posts and packing almost as much again as the books are worth is something which has already exercised the minds of booksellers.

The way the WIA is constituted has meant that Divisions also provide amateur books as a membership service. Since the extent of these operations has some bearing on the Divisional part of WIA subscriptions it could be argued that the centralisation of any commercial activity must first offset these Divisional profits before establishing any net profit to the Institute as a whole. Societies such as the NZART do not of course face this problem.

It was not overlooked that if a good service is to be rendered by an importer adequate stocks must always be held when it takes two or three or more months for fresh supplies to arrive from overseas after an order is placed.

Taking all these and other factors into consideration your Executive decided that the existing membership service should continue without change. Overseas magazine subscriptions will be processed as before and books will be available to members from their Division or from the Executive office as an alternative.

This is not the end of the road in searching for an acceptable money-spinner to subsidise WIA subscription rates. That these rates can be reduced or even stabilised within the means of the Institute is considered to be fundamental to its well-being and expansion.

A meeting was held late in January with the principal officers of the Radio Frequency Management Division of the Posts and Telecommunications Department. A considerable number of outstanding questions were discussed. Not least among these was the standardisation of amateur repeater conditions.

The conditions under which repeaters are authorised to be established and operated are mainly of interest to repeater groups rather than repeater users and will not therefore be detailed here except to say that the mis-use of repeaters can and does affect every user.

The Department believes sufficient data has now accumulated since amateur repeaters were first established to warrant a greater measure of decentralisation over licensing and control under standard conditions of general procedures.

They are naturally very concerned that amateur repeaters should not in any way cause harmful interference to other services. How this can be achieved is of course the concern of the relative repeater group in consultation with the respective Radio Branch

officers of the area where necessary. The Executive extracted this promise of co-operation and hopes that this will materially assist the groups whenever delays in licensing or other problems arise.

The fact was clearly established that the maximum power of a repeater is the same as the maximum power applicable to other amateur service stations hitherto operational — i.e. 150W. However the maximum power can seldom be utilised or authorised except in areas remote from other services. As soon as an amateur repeater is co-sited with stations of other services the problems of interference are usually so great that a suitable lower power limit must be accepted or the repeater must be moved to another location or the aerial systems changed etc. If the proposed frequencies of an amateur repeater cause, or are likely to cause, interference to other services then some other frequencies might resolve this problem. There are seven channels available in the 2m band and a yet-to-be determined number of channels in the 70 cm band. The band plan for 70 cm (in the segment 430 to 440 MHz) already notified by the WIA appears acceptable to the RFM Division and all that now remains, apparently, is to notify them of the repeater channels. The WIA Divisions have already been asked to submit their ideas.

The only other problem relating to 70 cm band usage is that the amateur service is the secondary service in the band 420 to 450 MHz. Consequently any assignments which may be granted to amateur stations in this band will be subject to withdrawal if the primary service wants the frequencies concerned.

Finalised during December and January were three Postal Votes. These were briefly mentioned in WIANEWS Jan. '76. The first was the 70 cm band plan. This was basically identical with the band plan published on p.7 of AR for Aug. '75. All Divisions accepted this band plan except VK4 from which detailed comments are still awaited and VK7 from which no vote was received. The VK2 Division accepted the plan in principle but reserved the right to bring up the following for discussions presumably as an agenda item for the 1976 Convention —

- (a) FM Simplex move from 440-441 MHz to 433-435 MHz;
- (b) 440-441 MHz segment to become experimental;
- (c) Move secondary TV channel down to 441-448 MHz with video on 442.25 MHz, sound on 447.75 MHz and allocate 448-450 MHz as a further experimental segment.
- (d) A modification to the upper limit of the ATV primary channel to reduce possible interference with EME operations.

As already stated this band plan was notified to the RFM Division in accordance with their requirement.

The second postal motion to be approved was the adoption of a frequency-sharing gentleman's agreement for Novice licensee operations. This is in line with the long standing world-wide gentleman's agreement on band-sharing in the HF bands adopted by Australian amateurs through the WIA. The postal motion did establish that the WIA would encourage adherence to the plan which is as follows:—

- (a) CW only — 3.525 to 3.535 MHz
— 21.125 to 21.150 MHz
— 26.960 to 27.030 MHz
- (b) Phone & CW — 3.535— 3.575 MHz
— 21.150—21.200 MHz
— 27.030—27.230 MHz

All Divisions voted in favour. VK4 passed on a comment that both ends of the 80m novice segment should be moved say 5 kHz higher in frequency to allow an established international usage of CW in the portion 3.525 to 3.530 MHz. A similar comment was made by VK6 relative to the 3.525 to 3.535 MHz segment on the grounds that existing users of this segment might well be forced to move down to the low end of 80m and thus interfere with inter-continental working therein. Both these Divisions nevertheless voted in favour of the band planning.

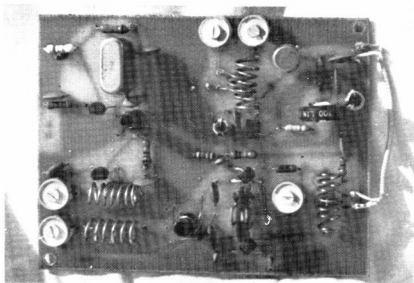
The remaining postal motion referred to the dates for the 1976 Federal Convention. All Divisions voted in favour of moving the dates to 7th to 9th May, 1976 in Melbourne with the exception of VK3 and VK7 from whence no votes were received.

The proposed 1976 Call Book is still very much under discussion but since the existing call book contract does not expire till 31st December next a number of problems remain to be surmounted.

TWO METRE SOLID STATE TRANSMITTER

Peter Williamson VK4ZWP/T
22 Bursaria St., Everton Hills, Qld. 4053

Having just completed a solid state 20m SSB transceiver the author resolved to produce a series of transmitters for use on the VHF bands.



Several circuits were considered from various publications; all but one used valves. Although high power output was offered, they were physically large and required a large power supply.

Since most SSB contacts in Brisbane are over distances less than 25 miles, it was considered unnecessary to construct a high power transverter. Also, the convenience of 12 volt operation for field days, without the use of a DC/DC converter or 240 volt alternator, was a desirable feature. Having thus decided on a low power solid state unit a circuit was found in an overseas publication and was duly constructed by the author and Graham VK4ZCL.

Results to say the least were disappointing (and costly). The receiver was unstable, the transverter radiated on several different frequencies, and was generally a beast to align.

Both devices were eventually scrapped and the challenge was taken to produce a unit which could be easily built and aligned using readily available components.

To date, six units have been built, and are operating satisfactorily. These have been driven by homebrew 20m transceivers, 10m from FT200, and 6m from a FT620, with minor coil changes to be detailed later.

No receiving converter is included on the PC board since most VHF active amateurs will already have at least one 2m converter which can be easily modified to suit. Both VK3 and IGL type converters have been used with complete success. For those who do not possess a converter a circuit is given for one but no further details (e.g. PC boards) are available due to limited space (and time). Also in the works is a linear amp using a 2N5589, producing single tone output of 3 watts, but again no details will be made available until exhaustive tests are completed.

Q1 is a series mode 3rd overtone oscillator operating at 43.3333 MHz (for 14 MHz input) in common emitter configuration. Slight frequency errors in the order of 800 Hz can be corrected by detuning L1/2. Q2 operates as a common emitter tripler with no fixed bias. RF drive is rectified by the BE junction and biases the transistor into conduction. L3/4 constitute a lightly coupled double tuned filter for the local oscillator output at 130 MHz. L4 is tapped to provide a low impedance output for the receiver converter mixer.

Q3/4 form a balanced mixer, capable of quite an acceptable order of power gain along with low intermodulation distortion.

Suppression of the local oscillator is achieved by parallel feed to the mixer input, the SSB being fed in push pull at a typical level of 0.3 volt. A fixed bias of 4 volts is applied to G2 of both FETs. The 22 ohm resistors provide parasitic suppression.

Q5 operates as a class AB linear amplifier and provides about 200 mW output on single tone. RV2 provides adjustment of the bias on Q5 for optimum linearity and output. Bypassing at LF and VHF is necessary to suppress any tendency towards parasitic oscillation. Typical output is 2.5



volts across a 50 ohm load using the RF probe detailed elsewhere.

Construction entails a small fibreglass P.C. board 3 1/4 x 4 1/4 inches which holds all components except the relay. Housing is up to the individual although some form of screening is desirable.

All components are readily available in Brisbane and the situation should be the same in other states. Do not forget the coax link between the mixer and PA!

ALIGNMENT

(1) Set RV1 and RV2 to mid range and connect a 50 ohm dummy load.

(2) Apply 12 volts to the local oscillator section and tune L1/2 for maximum on TP1. Zero indicates the oscillator is inoperative. A typical value is 0.5 to 1.0 volts; if more, the link L2 should be spaced to achieve a voltage in this range.

(3) Apply 12V to the mixer and LO and with a multimeter on Q3 source, tune C1 and C2 for maximum voltage, typically 0.5V rising to 1.5V. Check the LO output is on the correct harmonic (3rd) using a GDO or wavemeter.

(4) Apply the SSB input by either re-inserting carrier or test tone and tune L5/6 and C4 for an indicated output across the dummy load.

Remove the SSB input and check that

L5/6 is peaking on 144 MHz and not the LO frequency. (If it is tuned to the LO the indicated output will not drop).

(5) Tune C5 and C6 on the PA and retune C4 for maximum output checking the output is on 144 MHz with the GDO.

If available, listen to the signal on a 2m receiver and adjust the SSB drive level and RV2 for maximum output consistent with audio quality.

(6) Finally, remove the SSB input and adjust RV1 for a null at the LO frequency.

The transverter may be now used barefoot or to drive an external PA. Some may scoff at the practicality of a QRP transverter however regular 5 x 9 contacts (using a 4 element yagi) are held between Brisbane and Ipswich. If you really like a lot of power try running it into a 4CX250B or even a 6/40.

COIL DETAILS 2m TRANSVERTER

14 MHz Input

L1 10 turns 28 B & S on Neosid 722/1 former F29 slug.

L2 1 1/4 turns over L1.

L3 6 turns 0.25 ins. dia. 18 B & S TCW centre tapped.

L4 6 turns 0.25 ins. dia. 18 B & S TCW Tap 1.5 turns.

L5 25 turns 28 B & S Neosid 722/1 former F29 slug centre tapped.

L6 8 turns over L5.

L7 7 turns 0.25 ins. dia. 18 B & S TCW centre tapped.

L8 2 turn link 0.25 ins. dia.

L9 6 turns 0.25 ins. dia. 18 B & S TCW tap 2 turns from 12V rail.

L10 2 turn link 0.25 ins. dia.

L11 5 turns 0.25 ins. dia. 18 B & S tap 1T and 4T.

L12 4 turns 0.25 ins. dia. 18 B & S centre tap.

L13 25 turns 28 B & S on Neosid 722/1 former F29 slug.

L14 8 turns over L13.

28 MHz Input

(1) Remove C3.

(2) Reduce L13 turns to suit.

(3) Xtal 38.6667 MHz.

6m Input

(1) Remove C3.

(2) L5 10 turns centre tapped, L6 3 turns.

(3) Xtal 30.6667 MHz.

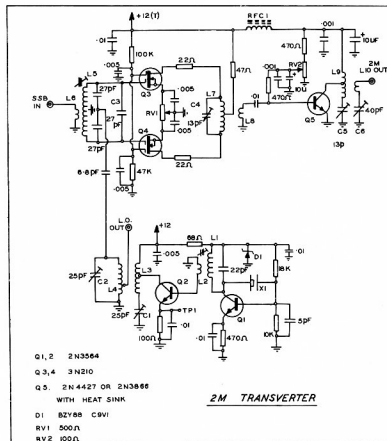
(4) Change 22 pF to 33 pF.

MODS TO IGL CONVERTER AND VK3 TYPE

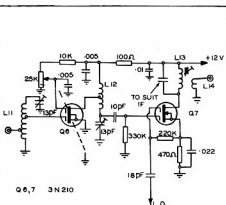
(1) Remove volts from existing oscillator Multiplier.

(2) Remove injection coupling capacitor.

(3) Feed LO through 100 pF coupling capacitor to mixer source. Source resistor to be 4700 ohm or 10 K.



2M TRANSVERTER



INEXPENSIVE MONITOR RECEIVERS FOR 2 METRE FM

The current availability of inexpensive AM/FM circuit boards suggested that these should be investigated to see if they would be capable of conversion to 2 metre FM monitor receivers.(1)

Two boards were purchased. These are designated 155-61209-02. Information from the suppliers indicates that the boards supplied were selected at random from very large stocks. If boards are ordered, there is no guarantee that identical boards will be supplied. However, it is believed that the general approach suggested in this article will be applicable to other types of circuit boards which may be purchased.

The first step is to ensure that the board is working. An inspection of the board indicated that a positive ground was required. If other boards are used, this may be determined by looking at any 100 uF capacitors and noting whether the positive or negative terminal connects to the common ground.

In this case, a 9 volt battery negative lead was connected to the switch on the volume control and the positive lead connected to the common ground. Before connecting the battery it is necessary to find where to connect the speaker. A small 2" speaker was available from a scrapped transistor AM radio. An inspection of the board showed a small output transformer was used. One lead of the secondary connected to the common ground and the other to a position on the board. The speaker leads were connected accordingly and the set switched on. A rewarding 'hiss' came from the speaker, indicating the wave-change switch was in the FM position. A switch to AM resulted in broadcast stations being

received. It is essential that the board be in working condition before any modifications are attempted. The local FM station should be received at reasonable strength.

MODIFICATION OF COILS

To convert the FM section to the reception of 2 metre signals, only the coils need to be modified. The local FM station should show three airwound small coils; the antenna lead will be connected to one and the coil nearest to this is the mixer. Both these coils will have about 4 turns. The remaining coil should have a smaller number of turns and this is the oscillator. The quickest and easiest way to reduce coil inductance is to cut off the mixer coil and the antenna coil at one end and then cut these coils so that two turns remain. They are then spaced out and soldered to the cut end projecting from the board.

The oscillator coil is cut at both ends leaving about 1/2" wire at each end. A piece of wire is soldered across these two ends to make a small hairpin loop.

LINING UP ON 2 METRE FM

Having made the coil changes, obtain a 2 metre signal source, such as GDO, signal generator (preferred) etc. and connect to the antenna. Tune in this signal using the main tuning capacitor, then peak up the mixer trimmer for maximum signal. An output meter can be connected across the speaker terminals if desired. Alternatively, if the discriminator circuit can be identified (usually by the two diodes) a suitable centre zero meter can be connected here and used for lining up. The identification of the four trimmers on the tuning gang can be made by switching to AM, identifying the oscillator and mixer trimmers for AM by adjustment and then noting the two remaining trimmers.

Basil Dale VK2AW
17/42 Diamond Bay Road, Vauluse, N.S.W. 2030

Slight adjustments may have to be made to the mixer coil by compressing or extending the spacing between turns so that the inductance comes within the range of the trimmer. Similarly, if the 2 metre signal from the signal generator is not audible, an adjustment of the oscillator trimmer should enable the signal to be received. A small change to the size of the coil may be necessary.

A small adjustment of the slug in the discriminator transformer should be made for the best audio response.

Results should be quite satisfactory for the small amount of time expended and the cost involved. In a poor location, a small antenna enables mobiles using the Sydney repeater to be received. Audio strength could be improved if desired by connecting to an IC audio amplifier.

A suitable case for the board and speaker and a small dial will improve its appearance.

Conversion to 52 MHz FM could be made using the original coils with a small capacitance across each coil. A GDO would be helpful in this case to locate the band.

When activity on FM is at a minimum, one can always switch to the broadcast band!

Additional information concerning the conversion of FM broadcast receivers is contained in an article in Ham Radio Magazine April 1974, pp. 34-38. ■

(1) Ham Radio Suppliers are offering AM/FM 10 transistor circuit boards at \$2.75 in their current advertisement in "A.R." Their address is 290 Bridge Road, Richmond, Vic. 3121.

Try This

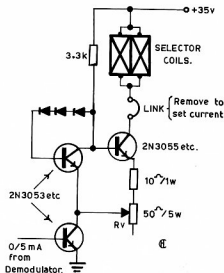
with Ron Cook VK3AFW
and Bill Rice VK3ABP

RTTY SELECTOR MAGNET DRIVER

Ron Cook VK3AFW

Conventional drivers use a high voltage, perhaps 120 volts or more. A series resistance is used to limit the static selector coil current within its rating, say 60 mA. While HV transistors are available for switching such voltages, it would be preferable to use a lower voltage more compatible with solid state equipment.

Reducing the selector coil supply voltage, however, produces a sluggish action and often results in poor copy. There is a solution. The constant current driver shown in the diagram allows the use of low voltages and inexpensive medium voltage transistors and provides fast clean operation of the selector.



The driver requires about 5 mA of drive (4.5 volts through 680 ohms). It is necessary to wire the selector's coils in parallel as shown. Any selector with rated (parallel connection) current in the range 30-180 mA can be driven.

To set up the unit apply 5 mA of drive and adjust RV for the required current (say 120 mA).

Connect up to the demodulator and away you go. ■

QSP

BROADCASTING

In his editorial to Telecommunication Journal of Nov. '75 the Secretary-General of the ITU, Mr. M. Mill, writing about the 1974/75 Conference to revise the Copenhagen Plan, says "The population of Africa, Asia and Europe taken together is 3235 million. And when we consider that broadcasting is directed at the individual listener and that long and medium waves have so wide a range, I wonder whether any international conference has ever before had the task of serving the basic needs of so many . . . low and medium frequency broadcasting is part of the national telecommunication systems. For many countries the role it plays and the priority to be given to it are vital". ■

HF TRANSCEIVERS (we have used gear too!)



uniden

AUSTRALIA'S FASTEST SELLING HF TRANSCEIVER

- Phase Locked Loop circuitry for optimum stability
- Separate USB/LSB/CW 8-pole crystal filters as standard and no frequency change required when going from USB to LSB
- Maximum accessibility to plug-in PCB modules, even the front panel can be swung out for easy servicing. Full spares catalogue plus parts available.
- Pair 6146B's in final with screen voltage stabilisation for minimum distortion products and a very clean output signal
- 90 day warranty
- Price \$570 including mic, cables, plugs, English manual

Frequency Ranges:

Bands (meters)	Frequency (MHz)
80	3.5 ~ 4.0
40	7.0 ~ 7.5
20	14.0 ~ 14.5
15	21.0 ~ 21.5
10(A)	28.0 ~ 28.5
10(B)	28.5 ~ 29.0
10(C)	29.0 ~ 29.5
10(D)	29.5 ~ 30.0
11	27.0 ~ 27.5
WWV	15.0



- Uniden 2020 80-11m transceiver, complete\$570
- Uniden external PLL FVO\$105
- Uniden matching signal\$28
- Yaesu FT100B linear amplifier\$430
- Kenwood TS-520 80-10m transceiver\$590
- Kenwood TS-900 - out of production
- Atlas 210X 80-10m solid state mobile including noise blanker\$695
- Atlas AR-230 AC power supply\$165
- Atlas deluxe mobile mount (DMK)\$55
- Yaesu FT75B mobile transceiver\$280
- FT75B AC power supply\$70
- DC75B DC power supply\$75

2 METRES FM



The IC21A is the 10 watt base station or mobile (146-148MHz) with variable power control, adjustable deviation, 24 channels, built-in discriminator meter, S meter, power/zer meter, PA protection and modular circuitry.... In addition:

- calibrate position netting switch allows the IC21A to listen to itself on simplex channels.
- The RIT control offsets the receiver frequency to bring in signals which are not properly calibrated
- complete with mic, cables, manual, 3 channels and the VCOM 12 month warranty.
- PRICE: \$298.



6 CHANNELS and 12 MONTH WARRANTY

- Features:
- solid-state T/R relay
 - PA protection
 - 5 helical resonators
 - 10/1 watt

Complete with cables, mobile bracket, mic, manual and 6 channels from the WIA Bandplan.

IC22A

\$219

PTT MICROPHONES-

- Yaesu YD-846 High Imp\$22
- Triol MC-15 low imp\$18
- Triol MC-10 high imp\$18
- Vicom for IC22/21A\$75

WHERE QUALITY COUNTS!

Surely, one of the big success stories in Amateur Radio comes from ICOM - Inoue Communication Equipment Corporation with its headquarters and manufacturing plant located at Osaka, Japan. Founded in 1963 by Tokuzo Inoue, the ICOM organisation produces the only VHF transceivers capable of operating in the heavy fields found at the base of the Tokyo tower; actual tests were held and ICOM emerged victorious! Inspiration for the company came from Tokuzo, as his friends call him, beginning at the age of 25 in electrocardiograph design, graduating to Sharp as a design engineer and finally founding his own company. This 43-year-old engineer's versatility and imagination are reflected in the quality products his firm produces.

ed by an on-air check! Performance is checked against specification parameters (3% fall at this stage) and rigs failing to meet the stringent requirements are re-worked. On arrival at VCOM performance is again checked against spec, crystal frequencies "tweaked" and the deviation properly adjusted for Australian conditions.



Tokuzo Inoue (left), founder and owner of ICOM with VCOM General Manager, Peter Williams.



One of the burn-in racks, where all sets are run for at least 24 hours.

The company motto "ICOM where quality counts" is more than just a catch-phrase, it is a way of life. Company pride and spirit can only be described as fierce. Production line testing and quality control is exhaustive: all boards are thoroughly checked and aligned before being assembled into the chassis and again when the set is finished. A further environmental check for 24.48 hours is given to every rig and then follow-

An active Research and Development Section at ICOM is the envy of their competitors and Tokuzo's pride and joy. This is where he can be found day and night. Truly amazing things are done here, with an offhand, casual appearance and an intense feeling of accomplishment. To enter this beehive of activity is bewildering. Test equipment fills the floor space, draftsmen produce drawings of equipment that seems fantastic - yet a short time later, there it is on the bench, operational. Here is where the quality starts and no compromises are allowed. Such rigid specifications are set up, it seems they cannot be met. Yet they are met, and daily, ICOM now has a large share of the world VHF market and its huge success in Australia epitomises attitudes by Amateurs "hooked" all over the globe. VCOM, as the sole Australian Distributor, is proud to be associated with this excellent product.

VICOM



Cables & Telegrams "IZYCOM" Melbourne, Australia

Head Office and mail orders....

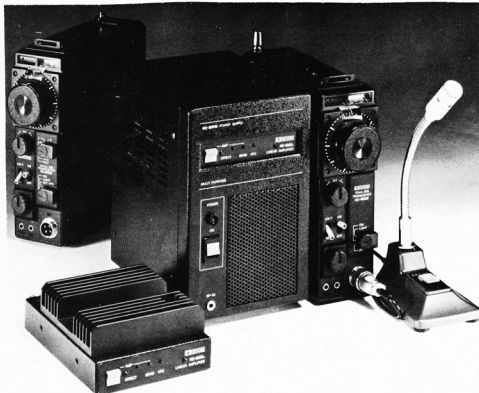
139 AUBURN RD., AUBURN, VIC. 3123 PH. (03) 82-5398

New Sydney Branch.....

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SPECIAL VICOM OFFER

A FREE RIG EACH MONTH!



Each month* Vicom will refund the cost of either an IC202 or IC502 portable ssb transceiver to a purchaser (selected by ballot) by mail order or at our Sydney and Melbourne stores. The odds are pretty good on getting a quality ICOM rig free!

IC202 2M SSB

This popular portable rig runs 3 watts pep output for ssb and 3 watts out for cw. Features noise blanker, RIT, VXO control (crystals supplied for 144.0 to 144.4) with provision for additional coverage for Oscar. Price includes English manual, carry-strap, dry-cells (there is provision for an external 13.8V supply if required) mic and the Vicom 12-month warranty!

IC502 6M SSB

The newest rig from the ICOM stable has VFO control 52-54 MHz at 3 watts pep output (3w output on cw, too). Includes noise blanker, clarifier, provision for external antenna and power supply, light mass (2.1 kg) with audio output 1 watt. Comes complete with mic, carry-strap, dry cells and the Vicom 12-month warranty!



IC202 2m SSB/CW portable	\$210
IC502 6m SSB/CW portable	\$219
IC3PS Power Supply	\$75
IC50L 6m linear amp	\$85
IC20L 2m linear amp	\$85

12 month warranty

* Offer closes 30th June 1976

NEW ACCESSORIES

- * Power Supply to match IC202/502 with facilities for plug-in linear amps — either 6 or 2 metres.
- * 2 metre ssb linear, 3 watts in for 10 watts output.
- * 6 metre ssb linear, 3 watts in for 10 watts output.



A CHARGER FOR SMALL MULTICELL BATTERIES

From time to time on the air one can hear discussions about the care and use of small rechargeable batteries and often there are marked differences of opinion. One speaker may contend that they should never be allowed to go completely flat while somebody else will say this causes them no harm. And so on. Here are the facts.

Much of the confusion arises from the fact that there are two types of rechargeable cell commonly available and their requirements are entirely different. These are the nickel cadmium or nicad cell and the alkaline cell. We will describe the nicad cell first.

The most outstanding characteristic of the nicad cell is that its normal potential is 1.25 volts which comes down to 1.2 volts during discharge. This means that for a twelve volt supply we need ten nicads in series as against eight standard 1.5 volt cells and six 2 volt lead-acid cells. At normal discharge rates the nicad cell remains at 1.2 volts until it is almost completely discharged and then the voltage falls off very quickly. If the discharge is continued with series connected cells some of them may even reverse polarity and this of course will cause the overall voltage to drop even more quickly. Contrary to what is often supposed this kind of treatment, although it does shorten the life of the cells slightly, causes no real damage and the cell can be restored to full efficiency by recharging at the nominal rate for about twenty-four hours.

Even under this kind of treatment one can expect several hundred cycles of charge and discharge. By avoiding overcharging and complete discharge, and if the cells are charged regularly, then several thousand cycles can be expected. In either case the cell does not 'die' suddenly like a lead acid or normal dry cell can do. It just gradually loses its ability to take a full charge and the end of its life is considered to be reached when it falls below eighty per cent of its original capacity. For example, when a five hundred milliamp hour cell will only give 400 mAh it is considered to have come to the end of its useful life. But of course, if one is prepared to accept this lowered capacity one can still go on using it.

One characteristic of nicads which can cause unnecessary concern is that they have a high self discharge rate. For instance after being left idle for three or four months it will be found the nicad could have lost as much as half its charge. There is however no need to worry because after a couple of charges the battery will come back as good as ever. But of course if it is left for a few months and used without a preliminary charge it may, for that particular cycle, only give a fraction of its capacity.

Because of this high self discharge rate it is recommended that if nicads are going to be left unused for a long period — say more than a year — they should be stored in a discharged condition. This treatment would of course completely ruin a lead acid cell but the nicads thrive on it. After having gone through two or three charge discharge cycles they will come back to full capacity.

CHARGING RATE

The charging rate for nicads is very much the same as for lead-acid cells; that is a ten hour rate. This means that the charging current should be such that after ten hours the cell would have received an amount of current equal to its normal capacity. For instance a 500 mAh battery would nominally require a rate of 500/10 or 50 mA.

The correct charging rate is the battery capacity divided by ten. But you do not charge it at this rate for only the bare ten hours. If you put 500 mAh in and got 500 mAh out it would be 100 per cent efficient and something like perpetual motion. In practice you have to put in quite a bit more to allow for losses. So the normal thing is to charge at this rate, not for ten but for fourteen hours. You put in 1.4 times as much as you get out.

In the case of the 500 mAh cell you would put in 700 mAh to bring it from a flat to a fully charged condition. It is possible to trickle charge nicads but they do not particularly need it. One thing they do not like is high temperatures especially when they are being charged. Also when the temperature reaches about 40 deg. Celsius their self discharge rate begins to increase noticeably.

There is of course no need to stick to the ten hour rate for charging as long as you do not greatly exceed it. On the other hand

Roy Hartkopf VK3AOH
34 Toolangi Road, Alphington, 3078

if you are not in a hurry you could charge them at, say, a twenty hour rate. This would in the case mentioned, be 500/20 or 25 mA for 28 hours.

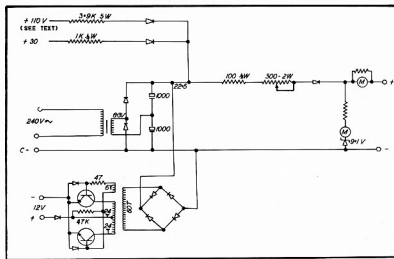
One final point. Because of the constant output voltage it is almost impossible to know just how much charge is left in the cell at any particular time. This means that if you do not want to be caught out you have to keep some rough check of the amount of use the cell has had since the previous charge, or else give it small and frequent charges to keep it fully charged.

During charging the cell voltage does rise and it is possible to tell if the cell is fully charged. Fig 1 shows the cell voltage plotted against the charging rate. You have to drop the charging rate to a low value, say twenty-five or fifty hours or lower, and after allowing the cell to stabilise the voltage can be measured. From the chart it can be seen that a fully charged cell will give 1.45 volts at the 25 hour rate and 1.4 volts at the 150 hour rate which in the example above would be 500/150 or 3.33 milliamps.

ALKALINE CELLS

The other common type of cell is the rechargeable alkaline type and its great advantage is that it is very much cheaper than the nicad cell. Another advantage is that it has an excellent shelf life, better than the normal cell and far better than the nicad. Alkaline cells can be stored (fully charged) for two years or more under normal storage temperatures. Finally the alkaline cell gives a nominal 1.5 volts and so is an exact replacement for the standard 1.5 volt dry cell.

Unlike the nicad cell, which keeps an almost constant voltage during discharge, the alkaline cell behaves in a similar way to the standard 1.5 volt cell and the volt-



age gradually drops to about 1.1 before the cell is discharged. Once it reaches this voltage it is essential to remove the load and recharge the cell. If the cell voltage is allowed to drop below about 0.9 volts an irreversible chemical change takes place, making it impossible to recharge the cell. This is completely opposite to the characteristics of the nicad which can be fully discharged without coming to harm.

Another difference between the nicad and the rechargeable alkaline cell is that the alkaline cell cannot be recharged to its original capacity. Size for size this original capacity is higher than that of the nicad but the rechargeable capacity is only about one fifth of this original capacity, and where the nicad can be recharged hundreds or even thousands of times alkaline cells have a life of only between ten and fifty recharges.

CHARGING DEVICE

The unit shown in the photograph and in the circuit diagram (Fig 2) was a charger to end all chargers, and primarily designed for the nicads in a Ken KP202. It delivers from about 15 to 40 milliamperes and will work from 240 volts AC, 110 volts AC or DC, 30 to 50 volts AC to DC and anywhere between 9 and 15 volts DC. It uses the constant current principle. The rectified voltage is 20 to 25 volts under load and the current is controlled by varying a wirewound pot in series with the 12 volt battery. A 6 volt 50 milliamp torch bulb also in series (not shown) will act as a charging indicator, current control and fuse. The 25 volts at the rectifier is obtained, when using a 9 to 15 volt supply, by a small DC to DC transistorised converter. The transformer is wound on a small ferrite core. Any toroid with about $\frac{1}{4}$ " by $\frac{1}{4}$ " section will do.

For good measure, mainly because they were lying around, a couple of small level meters were added and arranged so that when the volt meter shows a pre-established reading with the current meter at half-scale the battery is fully charged. Apart from the mount for the KP202 with its spring loaded fingers, two terminals are provided for charging other batteries.

For charging alkaline cells these terminals could be used and some voltage limiting device, such as a zener should preferably be added to keep the voltage from rising above about 13.5 to 14 volts. The alkaline cell, unlike the nicad, prefers constant voltage charging.

A final warning. Some alkaline cells are not rechargeable and may explode if recharging is attempted. So look carefully at the label!

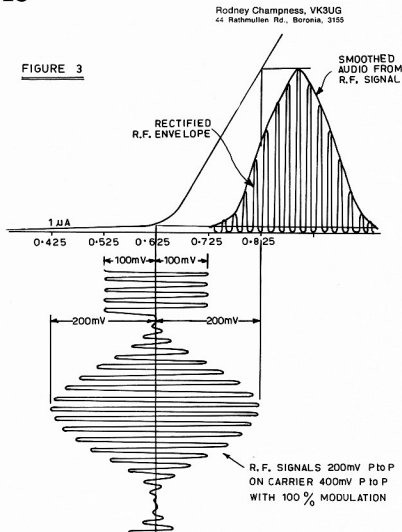
ELECTROMAGNETIC COMPATIBILITY

In the September 1974 issue of AR an endeavour was made to show you how audio frequency interference occurred and four diagrams were supposed to tell you all the story. However, Fig 3 may not have been as clear as intended to demonstrate a particular effect. Fig 3 is now re-drawn in a more exaggerated form. This time the offending RF signal is shown as being a 200 mV AM signal. It should now be clear when read in conjunction with the text on page 21 of September 1974 issue. The low level audio amplifier is now acting as an efficient RF detector — in fact like a crystal set feeding a high gain amplifier.

On the subject of *Electromagnetic Compatibility*, in particular *Audio Frequency Interference*, it might be of interest to know that the Regulatory and Licensing Section of the PMG do have small publications dealing with this problem. I am aware that both South Australia and Victoria have publications, the latest Victorian one of three pages is titled "Electro-magnetic Compatibility of Audio Equipment and Radio Transmitters" VRL 65. Other States may have information on this and related subjects too. These publications should be of considerable help to those troubled with Audio Frequency Interference.

A closing thought — If we go out into the blazing sun during summer with no protective clothing on we usually get sunburnt, so we take precautions against it. Now consider that the RF from your transmitter is also electro-magnetic energy, you wouldn't put an unprotected audio amplifier out in its field either unless you wish it to be affected by the RF. In other words the audio equipment or any other equipment vulnerable to high level RF fields should be protected by fitting RF suppression, then it can stand the high level RF just as we can stand the sun if we wear protective clothing.

FIGURE 3



SIDEBAND ELECTRONICS SALES and IMPORTS

UNIDEN 2020 AC-DC transceivers 10 to 80 M.	\$550	CUSH CRAFT ANTENNAS	
TRIO-KENWOOD TS-520 AC-DC transceivers 10 to 80 M.	\$530	Model DPGA 52-27 MHz adjustable ground plane	\$25
YAESU MUSET FT-101-E AC-DC transceivers 10 to 160 M.	\$650	LAC-2 lightning arrestors	\$6
TRIO-KENWOOD model QR-666 170 KHz to 30 MHz AC-DC receivers	\$300	Model AR-2 RINGO ½ waves verticals	\$20
DRAKE model SSR-1 Wadley loop 500 KHz to 30 MHz AC-DC receivers	\$325	AR-2X RINGO RANGER double ½ waves verticals	\$35
BARLOW-WADLEY model XCR-30 MK-II receivers	\$225	ARX-2 extension for AR-2	\$15
HY-GAIN ANTENNAS		A147-20T combination vertical-horizontal 2 M. Yagis, 10 elements each	\$60
14AVQ 10-40 M. verticals, 19' tall, no guys	\$65	A147-11 11 elements 2 M. Yagi	\$30
18AVT-WB 10-80 M. verticals, 23' tall, no guys	\$90	CRYSTAL FILTERS 9 MHz, similar to FT-200 ones, with carrier crystals	\$35
TH3JR 10-15-20 junior 3 el. Yagi 12' boom	\$135	FDK MULTI-7 2 M. FM 10 Watt transceivers with 12 sets of crystals, available all 7 repeater and anti-repeater frequencies plus channels 40, 50, and 52	\$225
TH3MK3 10-15-20 senior 3 el. Yagi 14' boom	\$180	KEN PRODUCTS KP-202 2 M. FM handheld transceivers with crystals for repeaters 1 to 4 incl. and channels 40 and 50	\$150
TH6DXX 10-15-20 senior 6 el. Yagi 24' boom	\$225	KYOKUTO 2 M. FM 12 Watt output transceivers with digital read-out and crystal synthesized PLL circuitry, 400 5 KHz transmit and 1000 5 KHz receive channels for normal simplex, repeater and anti-repeater operation	\$300
HY-QUAD 10-15-20 cubical quad Yagi 8' boom	\$200	ICOM IC-202 2 M. SSB handy transceivers, 144.0-144.4 MHz	\$185
TIGER ARRAY 204BA 20 M 4 el. Yagi 26' boom	\$190	AUTOMATIC MORSE KEYS EK-150 with built-in squeeze key paddle AC operated with monitor	\$75
BN-86 balun for beam purchasers only	\$18	FERRITE CORE BALUNS cheaper Japanese product for up to 500 W RF	\$12
ANTENNA ROTATORS		COAX CABLE-CONNECTORS-SWITCHES Amphenol type male, female, angle. T-connector, double male, double female, even female cable connectors!!!	all 100 cents each
CDR AR-22 junior for light and vhf beams	\$50	3 Position coax switch, when they at last arrive!	\$8
CDR Ham-II senior for all but 40 M hf beams	\$165	RG-8-U foam insulation cable, low loss ½" diameter	80 cents per yard
KEN KR-400 for all medium hf beams with disc brake	\$100	RG-58-U foam and standard insulation 3 / 16" diam.	30 cents per yard
All three models rotators complete with 230V AC indicator-control box.		Add \$1 cutting-handling cost for coax and rotator cable orders.	
4-conductor light cable for AR-22	20 cents per yard	P.T.T. DYNAMIC MICROPHONES 50K or 600 ohms with 4-pin Jap. plugs	\$10
12-conductor light cable for Ham-II	30 cents per yard	DUMMY LOADS, 50 ohms with Watt meters built-in 0-200 MHz, two types 0-15 Watt & 0-6 / 0-30 / 0-150 Watt	\$45 and \$80 resp.
8-conductor heavy cable for Ham-II	70 cents per yard	TRIO-KENWOOD DIP METERS Model DM-800 0.7 to 250 MHz few only	\$60
6-conductor heavy cable for KR-400	60 cents per yard	27 MHz TRANSCIEVERS 5 Watt AM 6 channels with 27.880 MHz crystals	\$75
DRAKE W-4 SWR-WATT METER 0-200 and 0-2000 Watt scales	\$60	1 Watt hand-held 3 channels 27.240 crystals	\$50
DRAKE TV-1000 TVI Low pass Filter	\$25	15 Watt PEP 23-channels AM / SSB model SE-501	\$175
SINGLE METER SWR METER	\$15		
TWIN METER SWR METER	\$22		
MARK MOBILE ANTENNAS			
Helical 6' long HW-40 for 40 M.	\$18		
High power KW-40 for 40 M.	\$25		
HW-20 for 20 M.	\$16		
Tri-band HW-3 for 10-15-20 M.	\$25		
Swivel mobile mount and chrome plated spring for all	\$12		
ASAHI MOBILE ANTENNAS			
AS-2-DW-E ¼ wave 2 M. mobile whip	\$8		
AS-WW ¼ wave 2 M. mobile whip	\$18		
AS-GM gutter clip mount with cable and connectors	\$10		
M-RING BODY MOUNT AND CAP FOR ¼ M. whips	\$5		

All prices quoted are net SPRINGWOOD, N.S.W. on a cash with order basis, sales tax included in all cases, but subject to changes without prior notice. No terms nor credit nor C.O.D. facilities, only cash and carry, no exceptions. ALL RISK INSURANCE from now on free with all orders over \$100, small orders add 50 cents for insurance. Allow for freight, postage or carriage, excess remitted will be refunded.

SIDEBAND ELECTRONICS SALES

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A SIMPLE VXO

Noel Lavelle VK3ABH
4 Wembley Court, Forest Hill, Vic., 3131

If you have an occasional requirement for external transmit frequency control of your transceiver for split-frequency DX operation on 40 or 80 metres, this VXO for an FT-101B may be of interest.

The design requirements appeared to be:

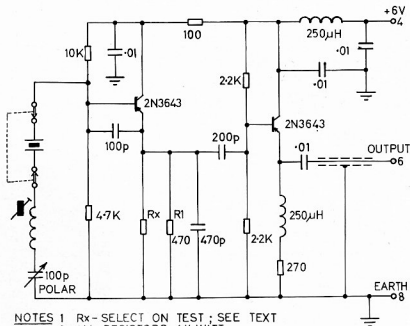
- small size, low cost
- stability: better than 10 Hz in any 10 minute period, including warm-up drift.
- low harmonic content and constant amplitude across tuning range
- compatibility: off; high output impedance. On: 120 mV rms into low impedance.
- frequency coverage: preferably all of the bottom 200 kHz, but, if necessary choose selected portions
- calibration: while direct calibration would be nice, small size dictated the use of a readily available vernier dial and calibration charts. Since the unit is to be used only for transmit this does not seem much of a hardship. Calibration is for LSB.

These requirements made a VXO look a more attractive proposition than a VFO.

The junk box should provide most of the components, but even if all parts were purchased new the cost would be low. Three of the five 3rd overtone crystals required for full coverage of the bottom 200 kHz are available from a large electronics firm at \$1.95 each. 3660-3700 and 7060-7100 kHz can be covered with just 2 of these crystals.

A 4½" x 3½" x 2" Eddystone diecast box makes a rigid shielded "cabinet". A 4½" x 2" side is used as the "front panel" (lid on top). Two tapped holes, just clearing the bottom of the box, are provided to mount the 50-mm vernier dial to the right of the front panel (top dial fastening not used). The 100 pF polar capacitor is mounted on a heavy steel bracket and carefully aligned with the dial bush. A small low-C 5-position 2-wafer switch is mounted to the left of the front panel. (A slide switch could be used if only two ranges are required). Solder the crystals directly to the switch contacts to minimise stray C.

The coil was wound on a surplus ¾" dia, slug-tuned PTFE former about 1" long, with "feet". (The commonly available nylon



- NOTES**
- Rx - SELECT ON TEST; SEE TEXT
 - ALL RESISTORS ¼ WATT
 - UNMARKED .01s ARE DISC CERAMIC
REMAINING C5 ARE POLYSTYRENE
 - CONNECTION NUMBERS ARE FOR FT101B PLUG
 - 2N3643 TRANSISTORS MAY BE REPLACED BY ANY NPN TRANSISTOR WITH $F_T \geq 100$ MHz AND $B \geq 100$

former of similar dimensions with a 900 grade Neosid core should be satisfactory). The coil must have high Q. Mount to the bottom of the case with ¾" spacers. Close wind about ¾" length of the former with about 0.25 mm dia enam. wire (about 30 AWG).

The remainder of the components are mounted on a piece of Veroboard to which are riveted ¼" long threaded stand-offs for attachment to the back of the box. Component layout is self evident. Mount R1 so that a clip lead can be attached readily to the emitter end. Leave room for Rx. Remember that rigidity in a VXO is just as important as in a VFO.

Once construction is completed, connect a frequency counter to the output, apply 6V, and trim the coil as necessary for the required frequency coverage. (L too small — insufficient frequency swing. L too large — excessive swing and poorer stability). When satisfied with the coil apply a coat of Araldite and allow to harden.

Readjust the coil slug if necessary and the output level may be set. This could be measured on the bench, of course, but the FT101B has about 3000 pF to ground from the common VFO line and provides a built-in level detector.

Plug the VXO into the FT-101B. Using clip leads, connect a decade resistance box (or equivalent) between the emitter end of R1 and ground. Set to maximum resistance. Switch on and tune in a fairly steady

AM broadcast station (not hard to find on 40 metres) using the internal oscillator and the VXO in turn. The S meter will read low when using the VXO. Reduce the resistance of the box until the S meter reads the same for both oscillators. Remove the resistance box and insert a resistor of the indicated value as Rx.

It is unlikely, but if the S meter reads high on VXO resistance is needed in series with R1. If the choke you use in the emitter of the output stage is an unknown from the junk box it may pay to unplug the VXO while tuned to a signal and check that the S meter reading remains constant. If not, try another choke.

The VXO can now be calibrated. The results obtained with 5 crystals are shown below. The crystals in positions 1 and 3 are from the junk box; those in 2, 4 and 5 are new units.

Switch position	Crystal Nom 3rd OT (MHz)	VXO range (kHz)	FT-101B LSB tuning range (3.5 or 7 MHz plus) (kHz)
1	27.595	9194.5-9143.5	007-058
2	27.425	9144.5-9096.5	057-105
3	27.3	9105.5-9070.5	096-131
4	27.24	9081.5-9038.5	120-161
5	27.125	9044.5-9002.5	157-199

FT101B LSB Operating Frequency:
80 metres = 12701.5 — Frequency VXO (kHz).
40 metres = 16201.5 — Frequency VXO (kHz).

A REVIEW OF THE ICOM IC 202

The Icom 202 breaks new ground on the two metre scene with a complete SSB package about the same size as the well known IC 22 FM unit. Furthermore the IC 202 has a self contained battery supply making it usable as a hand held portable.

Even though it is compact, all the usual facilities are included. A noise-blanker, "S"/RF output meter, and receiver off-set tuning are all standard features.

The ICOM 202 is distributed in Australia by Vicom International Pty. Limited of 139 Auburn Road, Auburn, Vic. The model used for this review was supplied by them and details of price and delivery can be obtained from them.

As supplied the 202 covers from 144.0 to 144.4 MHz in two bands of 200 kHz each. A normal VFO is not used, instead a stable, variable crystal oscillator (VXO) is employed. As we shall later see this has exceptional stability and also a very accurate and linear dial calibration.

Normal accessories supplied are a good quality PTT dynamic microphone, an over-the-shoulder carry strap, a set of dry batteries, a packet of connectors compatible with the rig, and an instruction manual.

The IC 202 measures 183/61/162 mm and weighs in at 2 kg complete with the internal batteries.

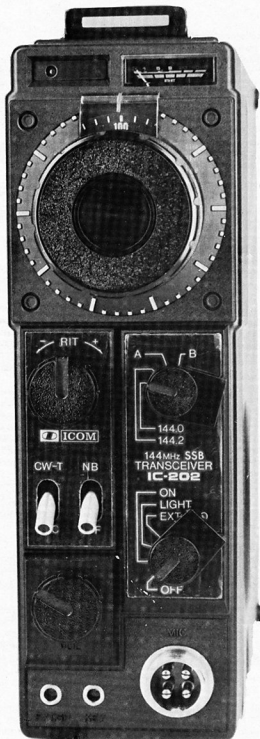
A quarter wave whip antenna is built in and this conveniently telescopes right into the cabinet. Connected in parallel with this is a recessed SO239 coax socket which enables the set to feed an external antenna.

Also provided are 3.5 mm sockets for an external speaker and the CW key. An external power socket is also fitted.

As the advertisements for the IC 202 state that the use of ni-cad batteries is recommended it seems a strange omission that no provision is made to recharge them. It would be necessary to either run temporary connections into the set, or remove the batteries and charge them in an external holder. Also it would appear that overall performance would be reduced by using ni-cads as there is only space for nine cells. With normal dry batteries, the recommended 13.5 volts would be available, but only 11.25 volts with ni-cads.

IC 202 CIRCUIT DESCRIPTION

A total of 7 FET's, 20 transistors, 27 diodes, 3 zener diodes and 7 IC's are employed.



The circuit is single conversion on both transmit and receive using a 10.7 MHz IF channel with a filter giving a 2.4 kHz band pass.

The VXO operates on a crystal frequency of 14.61 and 14.63 MHz for the two ranges supplied as standard. The band switch has provision for two additional crystals as well as an external VFO input. As far as can be ascertained no matching VFO is built by Icom to suit the 202. Output from the VXO is multiplied by nine with two tripler stages up to 133.7 MHz. In the receiver section, this is mixed with the incoming signal to produce the 10.7 MHz IF. The crystal controlled BFO on 10.695 MHz is also used as the carrier generator for the transmitter.

The receiver follows current design trends with a dual gate FET RF stage to an FET mixer. The IF channel consists of two FET's and one IC followed by a balanced four diode product detector and an LM380M audio IC. Fast attack slow release AGC is applied to two IF stages and the RF stage.

The receiver BFO is also used as the transmitter carrier generator.

Transmitter audio from an IC amplifier is fed along with RF from the carrier generator to an IC balanced modulator, then via a single FET stage to the 10.7 MHz filter

which is common with the receiver circuit.

Output from the filter goes to the transmitter mixer and combines with the VXO output to give the operating frequency. Four stages take this up to the normal three watt output level.

Full diode switching is used in the IC 202 thereby eliminating the bulk of a relay.

THE IC 202 ON THE AIR

Let me say right away that the performance of this little rig is quite superb. The dial mechanism is very smooth although perhaps a little too fast in the tuning rate. Both the dial scale and the "S" meter calibrations are rather small and ageing eyes will need a good pair of spectacles. However, considering the compact nature of the set, it is hard to see how these could be increased in size.

The various control knobs are rather small, but perhaps the worst feature is the very blurred designations for these controls. They are also an odd orange colour which does not stand out against the black panel. Surely white would be better.

Although the dial calibrations are small, their accuracy is surprising. Checked against our frequency counter, the maximum error was less than 1.5 kHz at the

main dial calibration points. As the 202 does not include a calibrator, it is nice to know that dial can be relied on. Stability was excellent also. At a constant temperature the frequency did not vary by more than 100 Hz or so.

Before putting the IC 202 on the air, I had doubts that the three watts output would make a worthwhile impression on the band — but not so. Many times it outperformed a ten watt output FM transceiver over the same path, and several successful contacts were made that would have been difficult on FM.

Unfortunately time was not available to do a full sensitivity check on the receiver but no doubts are held that the published figure of .5 uV would be easily met.

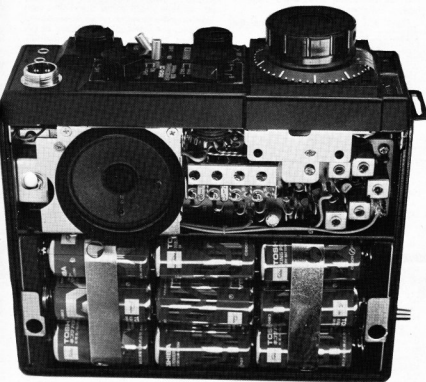
Receive audio was clean and easy to read. In fact it would be difficult to pick it from: the sound you expect from your normal HF transceiver.

A set of dry batteries would have rather a limited life and some form of external power supply is recommended. Current drain on receive varied from 85 mA to 140 mA with the noise blander and dial light switched on. Transmit drain was 165 mA under no output conditions up to 600 mA at full output and 650 mA with the dial light on. This was measured with 13.5 volts input.

INSTRUCTION BOOK

The book supplied with our IC 202 was written in Japanese but an English version is now available. However it would appear that little or no service information is included. The circuit diagram is of large size and very easy to follow.

The IC 202 is sold with a full twelve month warranty by Vicom International and of course they have a full back-up stock of spare parts.



REMINDER TO UNFINANCIALS

- If you have not yet paid your 1976 subscription, please note this reminder for personal attention.
- If you have not received any subscription notice please write for a duplicate.

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by the Executive, P.O. Box 150,
Toorak, Vic. 3142.

QSP

900 MHz AMATEUR BAND

According to Ham Radio Jan. '76 a 900 MHz amateur band is receiving consideration both in and out of FCC. Amateur space and satellite communication would find a new band in the 900 MHz region particularly valuable — it's high enough, says Ham Radio, to get away from a lot of noise and low enough that atmospheric absorption is not a problem.

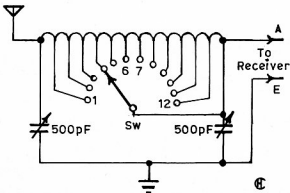
Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

EXTENDING VXO RANGE

Geoff Svensen VK2CAS

In many published applications of variable frequency crystal oscillators the tuning range available seems to be less than might be desired. Thus, to cover even a relatively narrow band such as 40 metres, may need several crystals. Here is an idea which enables all of most bands to be covered with a single VXO crystal plus a heterodyne crystal for each band desired. The amount of frequency swing applied to the VXO is relatively modest, only 100 kHz in 10 MHz.



Sw — 1 pole 12 position switch.

The block diagram shows the principle. The VXO frequency is multiplied by 6 and then heterodyned back to the wanted band. Further multiplication by 2 before mixing,

and then selecting the sum rather than difference output could provide VXO control over the whole 144-148 MHz band, so the idea is not limited to HF applications. ■

NEWCOMERS NOTEBOOK

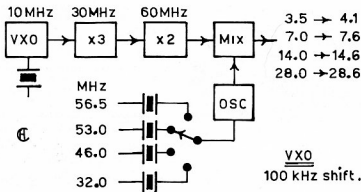
with

Rodney Champness VK3UG
and David Down VK5HP

AN ELEMENTARY ANTENNA TUNING UNIT

Following the recent article, Practical Antenna Basics, here is the antenna tuning unit that was to follow on from the simple types of wire antennas and whip dipoles.

For optimum performance, end fed wire and whip-type antennas should be matched to the receiver being used. This unit, although a basic type, is designed to help achieve that match. The coil consists of 24 turns of insulated (enamelled) wire about 16 or 18 gauge (not critical in this unit) wound on an insulated former $\frac{3}{4}$ " in diameter. Make a small loop on each alternate turn, and when the coil winding is complete, scrape the enamel off these loops and solder them to the tags on a single pole, 12 way switch. This permits switching in or out of the circuit the required amount of inductance to achieve the balance required.



The variable capacitors may be of the broadcast replacement type (415 to 500 pF) and when mounting these, equip each with a calibrated knob or dial, and then number the switch positions. Make the necessary adjustments for maximum signal strength on the required frequency, and if it is a frequency that is likely to be tuned again

in the future, then log the capacitor dial and switch position readings for subsequent use.

Note that when tuning for the maximum signal strength that the three adjustments are very much interdependent.

It is hoped to feature an Elementary Electronic Morse Key in the next article. ■

QSP

ARE WE NOT ALONE

Writing that 1976 is likely to be a very difficult year the RSGB President for 1976 in a message printed in Radio Communications Jan. '76 continues — "Hopefully the current rate of inflation will have slowed and the present hopeless task of trying to catch up with ever-rising costs will become easier . . . I appeal to every member to try to recruit at least one other new member during 1976 — numbers are strength and strong national societies are going to be vital to amateur radio in the period between now and WARC 1979. It is only just that all who benefit from amateur radio privileges should share the cost of their defence. We must also all remember the old saying that 'the amateur is a gentleman' — because it is by our behaviour on the air in the next few years that the world is going to judge us".

COMPLACENCY — U.S.A. STYLE

"The Ham fraternity is currently facing a potential

crisis because of encroachment attempts into our amateur allocated bands, licence restructuring, and above all, a decrease in our numbers with a corresponding increase in CB operators. If this trend continues, we will have less and less voice in frequency allocations nationally, as well as internationally. Additionally, manufacturers who already realise the monetary value of catering to CB operators will restrict production of amateur equipment or eliminate it entirely because of non-profitability. If we continue to be complacent, continue to be condescending to other groups in the media of communications, continue to sit in our ivory towers immune to the needs and desires of others, and continue to be apathetic in our direct actions, amateur radio will not survive". Quote from ARNS Bulletin Nov. '75 reprinted from WTIO Newsletter.

INTERFERENCE

"Canada goes after ignition noise with a new Radio Interference Regulation that takes effect next September 1. The new regulation will severely limit

the permissible radiation from any spark ignition engine, includes autos, chain saws and snow mobiles, with the one exception of aircraft engines. The regulation will eventually be extended to include other RFI sources such as power tools and high voltage transmission lines". Ham Radio, Jan. '76.

PHILIPPINE REPEATER

QTC Vol. 3, No. 1, the magazine issued by PARAF of Manila, advises the establishment of "the first amateur repeater station in all of Asia", on 29th November last year. DU1CSC, the Director of the TCB, and also Chairman of the Board of Communications of the Philippines, performed the opening ceremony. Other than the information given in the PARAF President's report for 1975 that it is "in the VHF band" no details of input or output frequencies and coverage area were given. Presumably it is located to cover the Manila area and operates in their 2m band. ■

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3.08	3/8	8	3	No. 3010	\$1.40
3.16	3/8	16	3	No. 3011	\$1.40
4.08	1	8	3	No. 3014	\$1.56
4.16	1	16	3	No. 3015	\$1.56
5.08	1 1/4	8	4	No. 3018	\$1.75
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ANNOUNCEMENT!

NEW GENERAL COVERAGE RECEIVER FROM YAESU



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(readable to better than 5 kHz)
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VHF UHF

an expanding world

with Eric Jamieson VK5LP

Forreston, S.A., 5233

Times: GMT

AMATEUR BAND BEACONS

VK9	VKOMA, Mawson	53.100
	VKQGR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WY, Sydney	52.450
	VK2WY, Sydney	144.010
VK3	VK3RTO, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTL, Mowbullan	144.400
VK5	VK5VF, Mt. Lofy	53.000
	VK5VF, Mt. Lofy	144.600
VK6	VK6RT, Perth	52.300
	VK6RTU, Kalgoolie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RT, Perth	145.000
VKT	St. Leonard's	52.400
	VK6RTV, Devonport	144.900
	VK6RV, Darwin*	52.200
VK8	3D3AA, Suva, Fiji	52.500
3D	JD1YAA, Japan	50.110
JA	VE1ATN, Canada	50.050
VE	KG6JAP, Guam	50.100
KG6	KG6APX, Guam	50.150
	ZL1RTH, Guam	50.090
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL1VHF, Palmerston North	52.500
	ZL1VHF, Wellington	145.200
	ZL1VHF, Palmerston North	145.250
	ZL1VHF, Palmerston North	451.850
ZL3	ZL1VHF, Christchurch	145.300
ZL4	ZL1VHF, Dunedin	145.400
ZL2	ZL2MHF, Upper Hut*	28.170

* Denotes change or addition since last month.

Still no definite news regarding operation or otherwise of the proposed six metre beacon at St. Leonard's, Tasmania, on 52.400 MHz. Will someone please write and confirm by the end of the month or it may have to be deleted. A report came fairly directly to me from VK6ZDZ in Perth that he was copying the Darwin beacon VK8VF on 11/1, so presumably it is on the air again, and has been included in the list.

The New Zealand HF beacon on 28.170 will be given monthly listing in future, as it is of interest to VHF operators as an indicator of the trend in band conditions, particularly being a source of constant power output, and its availability or otherwise can indicate a rising MUF. The other overseas beacons are still included as we are now approaching the equinoxial period when one might expect to hear some F2 DX, if not in the lower latitudes of the Continent, certainly in the northern areas.

THE SUMMER DX SCENE

It's been and gone! The DX that is. Depending on where you live and the number of hours you can be on the various bands will be a guide to what you generally thought of this year's summer DX period. My own observations will not be agreed upon by everyone, but that does not matter really, because they will be substantially correct, and as I have the last say as to what is printed you'll just have to read it!

SIX METRES:

Overall a much shorter season than usual, started late, with some very good openings early in the piece, went a bit quiet between Christmas and New Year, then brightened briefly, and departed within the first fortnight of the new year, or else the operators got tired!

TWO METRES:

Generally good, with some excellent openings both from north to south, and west to east. Nothing much offering between VK5 and VK4 and 2 as expected. Quite a lot more operators around who were prepared to give it a try on 2 when 6 metres was really good. The increase in availability of reasonably priced SSB equipment for 2 metres is

helping to populate the lower end of the band which is great news.

WHAT HAPPENED ON THE BANDS

Plenty happened of course, and it is difficult to sort out what is news and when. In the absence of any letters this month I think the best approach will be to go through my book of notes and tell you some of the things you probably already know, perhaps some you don't, and thirdly you will be able to think about your notes and say 'well, he did not know that ...' I did not, because you did not write!

15/12, heard from Jeff VK8ZGF in Alice Springs good signals on 6, advised he had 2 metre gear 60 watts input and 10 el. beam, so many years were turned that way for the next few weeks waiting for that elusive 2 metre contact from VK8 ... 20/12 P52KZT worked ... VK8ZGF through on 2 metres to VK6KJ in Albany on 21/12 at 1215Z ... 25/12 Kerry VK8SU at Ceduna working VK6XY and VK6BE at Albany via Adelaide Ch. 4 repeater ... 24/12 VK3ZUR and VK3ZCR worked VK6XY and VK6WG and VK6KJ at 2420Z on 144 MHz ... 11/1/76 I heard that Geoff VK3AMK worked VK8 on 2 metres to VK8SU through on 2 metres to Albany again. Bob VK5PB and Aub VK6XY used 144.080 to work each other on RTTY — first for both! Good work boys. VK6BE hearing VK5 on 432 MHz. Col VK5RD worked six VK6's on 2 metres. Gary VK5ZK worked VK6XY using a whip antenna on Ch. 5. (You make it sound so easy Gary!) ... 15/1/76 Keith VK5ZU worked VK6XY on 2 metres. Peter VK5ZPW hearing Ch. 1 Mt. William (Vic.) at 59 all day. Jim VK5ZMJ at Port Pirie worked VK6ZED and VK6ZBW in Perth on 2 metres (believe this is correct). So, what a day the first of 1976 turned out to be, will long be remembered by many operators, including myself, and even worked to Albany myself with six contacts on 2 metres SSB, and that takes going through my 30 GB hill!

31/1/76 Jeff VK8ZGF observing TV signals on Channel 4 ... Wally VK2ZNN working into Sydney from Orange using 5 watts of SSB, also note Jim VK2BPC has 2m SSB in Wagga ... 4/1 Kerry VK8SU working VK6's again on Ch. 40 and SSB, six contacts. Clarrie VK5NA at Angaston worked VK8ZED's ... 5/1 Keith VK5SV worked Kevin VK7ZAH via the Ch. 1 at Mt. William repeater at 1250Z ... 6/1 VK5SU worked Hughie VK5BC in Adelaide Ch. 4. VK2ZJ worked into Adelaide also via Ch. 4, and reported good copy direct ... 7/1 Bob VK5RF New home from Wagga and not an instant investigation, probably accounting for the signals from that direction being so good ... Ch. 0 TV from Goulburn very strong at VK5LP QTH, only a translator on 51.740 with vertical polarisation ... 11/1 Peter VK6ZDJ copying Darwin beacon VK8VF ... 18/1 Kevin VK7ZAH worked Peter VK5ZPS and Clarrie VK5NA on 14.1 at 1930Z ... 23/1 Colin VK5DK reported their new repeater will probably be on Ch. 3, and that work on the 2 metre beacon is proceeding, and could probably operate on 144.650. John VK5ZJB reported good 2 metre conditions to Ch. 1 repeater, also six 2 metre contacts made to Albany again. Visitor to VK5, VK5YJFS went up to Mr. Lofy with his 602 rig and worked Fred VK3AZG on 144 SSB using the whip antenna on the small rig; a bad effort! All this occurring on 28/1.

There you are. That's a pretty fair coverage of the best bits. Probably one of my more interesting contacts was on 20/12 at 0432Z when I worked Allan VK4ZRF on 52 MHz who was running 20 milliwatts of power. He was a good strength 7, but quite a little weaker coming for 6 metres, and much attenuation of signals on such days obviously.

Two observations from the VK5 arena this year include the lack of ZL stations worked from this area. Many were worked in VK3 and VK7, also in VK6, but scarce here. First time ever since being on VHF that I have never ever worked a ZL at some time during the summer period. Almost as elusive were VK7's to VK5 this year, very silent indeed. So it can probably be presumed the south east path for 6 metres did not suit us at any rate, quite an unusual situation.

Very few AM stations seemed to be operating on 6 or 2 this year, mostly SSB, with an occasional CW signal. Operating manners were very good all round, and quite a few reliable comers for 6 metres. I did get asked nicely by someone one day to reduce the audio level a bit as I was causing a few problems in VK2 due to the excellent band con-

ditions. This I immediately did, and was thanked for it. No one should mind being told in a pleasant manner to reduce their power under such conditions, and I did reduce this power, and that being made on two other occasions to other operators with similar results. Later that same day when the band closed I did something I was going to do for a long time, and that was to re-arrange the relay switching to allow me to run barefoot at 10 watts on those days when the band is wide open, and using a 10 watt relay. This has been confirmed by the MUF. Thanks for the advice, no problem this end.

Bruce Kendall 130576 writes briefly to mention his reception of GLV10 in Mildura-Swan Hill area on 10/1 on his colour TV, and asks if it can be related to any 2 metre DX at the time. Reference to my books indicated a good day for 6 metre DX, in fact the band was open for at least 1 hour, so it is quite possible the MUF did rise high enough to permit short skip reception of such signals. I have observed many times that TV signals can be received at very high frequencies often around 0100Z on days of intense six metre activity, but these high channel signals mostly only last for a few minutes, and so, hope you have enjoyed this, and glad you enjoy reading the notes.

MICROWAVES

For those of you who may have been giving some thought to entering the world of microwave transmission, there is a very extensive and interesting article in the December 1975 issue of "Break In" from New Zealand by ZL2HI, with duplex operation on 3300 MHz using Klystrons. There are photographs, drawing and circuits. The Klystron is type CV237. Three foot dishes are used, plus a 30 MHz receiver. The equipment detailed was used during the successful world record bid for 3.3 GHz over a distance of 238 miles between Mt. Murchison and Mt. Ruapehu in February 1975. So go to it!

There is not a lot of other news to impart at the moment, with everyone working so much DX, not many other things are being done. I hope that 1976 continues to see the present increase in SSB operation on 2 metres go on, and it probably will while there is equipment available.

Closing with the thought for the month: "Don't put off for tomorrow what you can do today, because if you enjoy it today you can do it again tomorrow".

The Voice in the Hills.



Continuing the examination of the ITU Regulations where we left off last month we come to the amateur band on 6m.

In Regions 2 and 3 there is an exclusive amateur allocation from 50 to 54 MHz with numerous footnotes. In R1 47 to 68 MHz is allocated to broadcasting but by footnotes 50 to 54 MHz is allocated to the amateur service in all countries except Zambia and Malawi, Zaire, Rwanda, Burundi, South Africa and S.W. Africa. Strangely in Australia 50 to 54 MHz is allocated to the fixed, mobile and broadcasting service and the band 56 to 58 MHz is allocated to the amateur service. However the Australian PMG's booklet shows 45 to 52 MHz is being allocated to broadcasting (TV) as the primary service and fixed/mobile as secondary services; 52-54 MHz is shown as exclusively amateur service, 54-56 for fixed and mobile and 56-70 as Broadcasting (TV) primary and fixed/mobile as secondary.

In New Zealand 51-53 MHz is also allocated to the fixed and mobile services and 53-54 MHz is allocated to these two services. 50-54 MHz is allocated to fixed and mobile services in India, Indonesia, Iran and Pakistan. The band 50 to 51 MHz is allocated to the fixed, mobile and broadcasting services in Malaysia, Singapore and New Zealand.

As soon as you reach the VHF regions you come up against non-conformity by footnotes with apparent international allocations to broadcasts.

Although nothing seems to be shown in the ITU Regulations the UK possesses an amateur band on a secondary basis from 70.025 to 70.7 MHz

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provided no interference is caused to the primary services of Fixed and Mobile (except aeronautical mobile).

In all Regions the band 144 to 146 MHz is allocated to the amateur and the amateur satellite services whilst in R2 and 3 the band 146 to 148 MHz is allocated to the amateur service although, by footnote, this allocation is applied to the fixed and mobile services in China, India and Japan. In R1 the band 146 to 149.9 MHz is allocated to the Fixed and Mobile (except aeronautical (R)) services. In South Africa, Rhodesia (and presumably Zambia and Malawi) and S.W. Africa the band 146 to 149.9 MHz is also allocated to the aeronautical mobile service.

In Region 2 there is a shared Amateur and Radiolocation band at 220 to 225 MHz. This band is also allocated to the amateur service in Rhodesia (and presumably Zambia and Malawi).

The next amateur band is 70 cm. In Regions 2 and 3 the band 420 to 450 MHz is allocated to Radiolocation as the primary service with amateur as the secondary service. In R1 both Amateur and Radiolocation share the band 430 to 440 MHz. There are the usual flow of footnotes. In the UK the radiolocation service is primary and the amateur service is secondary. 449.75 to 450.25 MHz may be used for space telecommand and space research (earth to space) by agreement between countries concerned and a similar arrangement exists for 434 MHz + or -0.25 MHz in France and Guyana.

438 MHz is the band authorised for the amateur-satellite service provided no harmful interference is caused to other authorised services. In Indonesia 420-450 MHz is also allocated on a secondary basis to the fixed and mobile services (except aero mobile). In Australia 420 to 450 MHz is also allocated to the fixed service until the frequency assignments are transferred elsewhere but this is not mentioned in the Australian booklet of tables. However radio altimeters are continued to be allowed in the 420-460 MHz band as a secondary service according to the booklet. There are many other footnotes about this band. The UK has for amateurs 430-432 (in part) and 432-440 MHz only.

In R3 the band 470 to 565 MHz is allocated to the broadcasting service but the Australian booklet allows 576-585 MHz to the amateur service until required by the broadcasting service.

There are no other ascertainable amateur allocations below 1000 MHz anywhere.

WARC 1979
At this early stage there are bound to be rumours floating about, straws in the wind and all kinds of skulduggery afoot. Latest items to come from overseas are that some European administrations are suggesting that any references to the training or educational aspects of amateur radio should be deleted. Another rumour has it that several ITU delegates expressed the opinion that the definition of amateur radio should be deleted from the Radio regulations. If this happened there would be no amateur radio because frequencies could not be allocated to a non-existent service.

Another aspect which may cause much concern is the simple fact that each country at ITU conferences possesses one vote. The ITU is, or was, basically a technical co-ordination organisation designed to provide a forum for general agreements internationally on the use of the strictly limited frequency spectrum.

A considerable number of member countries, such as the 'third world' countries (newly independent and other less developed countries in particular), cannot afford delegations comprising both technical and diplomatic or administrative officers. Consequently many of them are represented at ITU Conferences by staff from their nearest diplomatic offices. Most of these people could be entirely devoid of technical training relating to radio and electronics.

VK3 WESTERN ZONE ANNUAL CONVENTION 1975

The 1975 VK3 Western Zone Convention was held at Warrnambool on the weekend of 1st and 2nd November. The Lady Bay Hotel was the venue for Saturday's activities which included a very comprehensive display of amateur and test gear provided by some of the major suppliers. LARA took

the opportunity to extend and publicise its activities.

During the dinner which followed a presentation was made to "Woody" VK3AGD for his extended service to amateur radio and radio communication in general. "Woody" was for once speechless on discovering his IC22A. Other presentations were made to Tim VK3VTV and Bert VK3EF for hosting the 3m and 80m call backs and to Brian VK3ZPS for his lecture course at the Lake Bolac Novice Class. Don VK3AKN was presented with a very special timer to commemorate his efforts on "Bill on the Hill" Ch. 1 Mt. William.

Sunday activities were based at the Wagon Hill. Those successful in the competitions were VK3HY, VK3ZKH, VK3YER, VK3ZED, VK3YFF, VK3BHD, VK3NM and VK3BHM. The children's scramble was won by Neil, son of VK3AIZ, the VL scramble by Irena YF/VK3SYER with Robyn YF/VK3ZYG and Mavis YF/VK3BER equal second and Jenny PXYL/VK3AQO won the lucky door prize.

Attendance at the dinner was 168 people with more than 200 attending the Sunday barbecue. This included 93 amateurs with 8 from VK5 and 4 from VK2 making this a very successful convention.

BOOK REVIEW

NBFM MANUAL

R. S. Hewes G3DTR
G. R. Jessop G6JP

This RGB publication is not up to their usual high standard and appears to have been put together in a hurry.

The book is devoted to NBFM which is defined as an FM system using a deviation less than that used by hi-fi broadcasters.

FM theory, transmitters, receivers and auxiliary equipment are covered in 60 pages. There are nearly 70 circuit diagrams, most of which use transistors or integrated circuits. Unfortunately some of the circuits are not discussed at all in the text.

The operator of a commercial FM transceiver will find little of interest, other than the chapter on FM theory. Most constructors will find something of interest. For example, there are 9 different types of FM detectors. Unfortunately, some important topics such as antenna, high power transmitters (more than 1 watt output) mobile operation and complete transmitters are not covered. Operation at frequencies other than 145 MHz receive scant attention.

Nevertheless, the book is still worth a place on your bookshelf.

VK3APW

Contests

CONTEST CALENDAR

March

6/7 ARRL DX Phone
6/7 YL-OM CW
20/21 ARRL DX CW
27/28 BARTG RTTY
27/28 CQ WW WPX SSB

April

24/25 VERON Netherlands
24/25 Bermuda Phone

May

1/2 Helvetia
8/9 Bermuda CW

BARTG SPRING RTTY CONTEST

When — 0200 GMT Saturday, March 27th until 0200 GMT Monday, March 29th, 1975.

The total contest period is 48 hours but not more than 30 hours of operation is permitted. Times spent in listening count as operating time. The 18 hour non operating period can be taken at any time during the contest, but off periods may not be less than 3 hours at a time. Times on and off the air must be summarised on the Log and score sheets.

Who — There will be separate categories for Multi Operator Stations and SWL's.

Bands — 3.5, 7.0, 14.0, 21.0 and 28.0 MHz Amateur Bands.

Stations — Stations may not be contacted more than once on any one Band, but additional contacts may be made with the same station if a different band is used.

Country Status — ARRL countries list and in addition each W/K and VE/VQ call area will be counted as a separate Country. (But W/K and VE/VQ counted once only for QCA).

Messages — Messages exchanged will consist of:

A. Time GMT. This must consist of a full 4 figure group. The use of the expression "Same" or "Same as yours" will not be permitted.

B. RST and Message Number. The message number must consist of a 3 figure group starting with 001 for the first contact made.

Points — A. All two-way RTTY contacts with Stations within one's own Country will earn TWO points.

B. All two-way RTTY contacts with Stations outside one's own Country will earn TEN points.

C. All Stations will receive a BONUS of 200 Points per Country worked including their own.

NOTE: Any one Country may be counted again if worked on another Band but Continents are counted once only.

Scoring — A. Two way exchange points times total Countries worked.

B. Total Country points times Bonus points times number of Continents worked.

C. Add (A) and (B) together to obtain your final score.

Sample Score:
Exchange Points (302) x Countries (10) = 3020
Country Points (10) x Bonus Points (200) x
Continents (3) = 6000

(A) and (B) added together to give a score of 9020

Logs and Score Sheets — Use one Log for each Band and indicate any rest periods. Logs to contain:

Date, Time GMT, Call sign of Station worked, RST report and message number as sent, RST report and message number as received and exchange points claimed. All Logs must be received by May 31st, 1975 to qualify.

Certificates will be awarded to: The leading Stations in each class and to the top Stations in each Continent and each W/K VE/VQ Call area. The final positions in the Results Table will be valid for entry in the "World Champion of RTTY" Championship.

The Judges decision will be final and no correspondence can be entered into in respect of incorrect or late entries.

Send your Contest Logs to:

Ted Double (GBDWW)
89 Linden Gardens,
ENFIELD,
Middlesex,
England EN1 4DX.

ADDITIONAL NOTES

(A) If a contestant manages to contact 25 or more different Countries on two way RTTY during this contest a claim may be made for the QUARTER CENTURY AWARD issued by the British Amateur Radio Teleprinter Group and for which a charge of 2 dollars U.S. or 8 IRC's is made. Make your claim at the same time as you send in a Contest Log. Holders of existing QCA Awards will automatically have any new additional new Countries added to their records.

(B) If any contestant manages to contact Stations on two way RTTY with all six Continents and the BARTG Contest Manager receives Contest Logs from the operators in those six Continents a claim may be made for the WAC Award issued by the RTTY Journal. The necessary information will be sent on to the RTTY Journal who will issue the WAC Award free of charge.

COMMONWEALTH CONTEST 1976

A reminder is given that this CW Contest will run from 1200Z Saturday, 13th March until 1200Z Sunday, 14th March, 1976.

Rules are as published on page 22 of last month's AR. There are medals to be won by the VK winner and VK middle placing.

IONOSPHERIC PREDICTIONS

WITH LEN PONTNER VK3ZGP

Greetings for 1976. Hope you worked your share of the DX over the past few months. Since last writing I have had the opportunity to look at the scene a little closer.

Both Frank VK2QL and myself have pointed out the valuable information available daily on WWV(H), namely the solar flux and A index. I know quite a few listen for it and discuss it on air. However, when plotted into simple graph form it is amazing how quickly they start to tell a story. Whilst the actual predictions are for average conditions, taking into account season, projected smoothed sunspot number, they do not allow for the wide variation from average that can occur daily during the sunspot minima period.

In 1968 Arthur Covington EX-VESCC, a pioneer in the development of solar flux measurements, made a projection for the ending of cycle 20. His detailed records dating back to 1947 show the end of cycle 18, early 1954 reading 55. Cycle 19 reached its low of 67.2 in October 1964, some 10.5 years later. Projecting 10.5 years from that low, Covington gave March-April 1975 as cycle 20 minimum. Recorded figures show March 71, April 70.7, May 70.1, June 70, July 77.

From observations, it appears Covington went very close. April produced the "lowest high" while June produced the "lowest low" 73.8 and 66.1 respectively. My charts during the period show May 10 to June 25 not rising above 70 until a sizeable spot group appeared around June 30, raising the flux to the high 70's, mid-July to 88, then early August to 125 the highest since Oct. 74 when it rose to 140. However, a word for the band watchers. Follow carefully the A index for a downward movement just prior to a geomagnetic storm. When it reaches the 2-5 region, the WWV 14 past K index says 2 or less and tending to decrease — you can usually find, within the predicted times, higher than normal conditions just before storm commencement. Depending on which portion of our planet is in the sunlit part when the storm arrives the effect will be shown either first on WWV or earlier (by a sudden or gradual change in general conditions) and be verified by WWV within 24 hours.

Once the A has risen above 12-15 conditions generally are poor for 3-5 days. Once again peculiar conditions do exist over various parts and propagation will exist for limited periods. During this pre-storm period and in our daytime the bands will often open from 28 MHz down — even 52 MHz featured in Dec. '75.

Whilst WWV and WWVH at 18 and 45 mins past the hour give yesterday's (GMT) figures for solar flux and A, the 14 past from WWV (male voice with minute announcements) still gives valuable information about today from 0700Z onwards.

Approx. conversion from K to A for that period is 1 = 2.5, 2 = 7.1, 3 = 4.0, 4 = 27.40, 5 = 70, 6 = 80-120, 0-2 K being average for non storm readings. The highest K I have heard is 6 at 0600 Z giving a daily mean of A52. Perth often records K7 in severe storms.

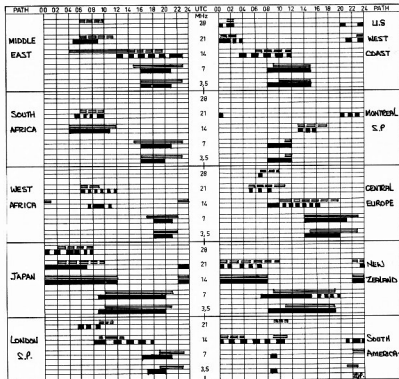
Those that start suddenly often end likewise. The slow transition from 10 to 1-5 days. You will appreciate them both when they happen.

I use the Bartels solar rotation periods for recording each 27-day rotation of the sun. Commencing dates to come are March 7 period N. 1950, April 3 period N. 1951. The storm commencement date usually drops back 1 day each period i.e. period A starts 10th day next period will start on 9th day. If you use graphs, then the picture comes a little clearer. Try your own observations and keep records and make your own predictions.

LATEST INDICES AVAILABLE (late Jan. '76)

Observed:
Solar Flux: monthly mean 8/75 = 99, 9/75 = 80.
Sunspot: Prev mean 11/75 = 19.3, 12/75 = 7.5.
Smoothed mean 5/75 = 16.8, 6/75 = 16.0.

Predictions:
Solar Flux: monthly mean 4/76 = 71, 5/76 = 70, 6/76 = 70.



LEGEND FOR CHART — ALL TIMES — UNIVERSAL (GMT).
LINES = FROM WEST AUSTRALIA.
BARS = FROM EASTERN AUSTRALIA.
SOLID LINES OR BARS = BETTER THAN 50% OF THE MONTH.
BROKEN LINES OR BARS = LESS THAN 50% OF THE MONTH.

Sunspots: smoothed mean 4/76 = 5, 5/76 = 7, 6/76 = 6.

Acknowledgements:

Sunspot Data — Dr. Waldmeier, Swiss FED OBS, Zurich.

Solar Flux — ITU Journal WWV.

A-Indices — Bureau of Min. Resources, Toolang (Melb.), Munzaring (Perth), WWV.

Predictions — IPS Sydney.

Part quotations from the ARRL IW memo are hereunder embodied — "The level of IW activity continues to be high and many complaints of harmful interference have been acted upon by the FCC. The point to emphasize is that a great deal has been going on. With the World Administrative Radio Conference four years away, we need a strong Intruder Watch now more than ever."

There seems to be some confusion as to which modes of transmission other than amateur are intruders in the 3.5 MHz band. Thus, the following taken from the ITU Allocations, serves to put things in perspective. Although we are only concerned with Region 3 I shall quote the other regions also — "In Region 1 3500 to 3800 is amateur, fixed and mobile, except aeronautical mobile. In Region 2, 3500 to 4000 is amateur, fixed and mobile, except aeronautical mobile. In Region 3 3500 to 3900 is amateur, fixed and mobile, but a footnote says, in Australia the band 3500 to 3700 is allocated to the amateur service; the band 3700 to 3900 is allocated to the fixed and mobile services".

When observing and reporting intruders in the 3.5 MHz band it is necessary to ascertain the country of origin of fixed or mobile stations in the band 3500 to 3700 before reporting them.

Unless they originate in Australia all fixed and mobile stations in the band 3500 to 3700 are not intruders. On the other hand all the broadcast stations are intruders and we need all the reports we can get on them so as to be able to make up a dossier to present to our authorities. Reference, though the facsimile F4 transmissions on 3600 and 3623 kHz which are originated in Japan, although not actual intruders (refer to 3500 to 3700 allocations in Region 3) these stations have been reported by the FCC in Region 2, and more details are needed to forward to the FCC via ARRL. "The Commission desires to approach the Japanese

Intruder Watch

with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

It is of importance to all Region 3 Amateurs that, through the representations of the WIA Executive, our Radio Administration is now more aware and thus more co-operative of the role being played by your Intruder Watch. All persistent intruders are now being monitored by our monitoring stations, and will in due course, as soon as sufficient evidence has been accumulated, be reported to their respective Administrations. Your Co-ordinator is very grateful by this step forward because it is by his and by the VK3 Co-ordinator's efforts that the improvement has been brought about.

At the same time I often wonder at the apathy shown by most members in reporting intruders. I can talk to practically any Amateur and the response verbally to any request regarding IW is excellent, but when it comes to doing anything concrete the response is normally nil. This puzzles me considerably, although in 50 years of amateur activity, I should know the apathy of the average amateur.

Administration again in this matter and solicits help. In particular, needed are details as to specifically where the interference is being caused, and its severity. Our reports so far show that the interference occurs mainly between the hours of 1200 and 1600 GMT, the interference being experienced over a greater area during different hours? Note that the above facsimile stations are not categorised as 'intruders' since the 3.5 MHz band is shared with the fixed service, but the Japanese Administration does, in good conscience, want to avoid interfering with the Amateur Service".

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor,
Dear Sir,

We were delighted to read the review of our Clipper, but would like to take this opportunity of clearing up one or two ambiguities.

The standard version of our clipper as sent for review is suitable for use with the FT101 Mark 2 and 1000 GMT, the interference being experienced over the VFO of the FT101B, and the FT101EE. It may also be used with the FT101E and full instructions for disconnecting the internal clipper are included.

The standard version of our clipper is not suitable for use with other Yaesu models, but readers might like to note that we do a "Special version" at the same price for use with the early FT101 Mark 1, although this is slightly more difficult to wire in.

Regarding the noise blander comments. The apparent reduction in performance has a simple explanation. On receive very large noise pulses are reduced in amplitude by the diodes in the clipper, and hence with the clipper in circuit noise is to some extent already "blanked". When the noise blander is switched in its work has already been "half done", and hence while the total effect of the interference should be no worse, the noise blander switch has less effect on it.

Finally readers might like to note that we have made arrangements with our bank to accept Australian currency and so cheques or bankers drafts for \$69 Australian will be accepted for an experimental period.

Best regards to all those down under 73's. G3LLH
Harry Leeming, FSERT, T. Eng. (CEI).

Dear Sir,

Now that the PMG has ceased to exist as such there is an opportunity for the Wireless Institute of Australia to refrain from transferring its attitude of abject servility to the new Commission and instead to stand up for the interests of the members.

I have long been disgusted by this attitude and by attending annual dinners because the sight of members fawning on the PMG representative literally gave me indigestion.

The Institute has been repaid as one might have expected by being used as a doormat in the present internal squabble. The harm that has been done to the amateur movement by the strike over examinations is incalculable. The incredible mess the new commission is showing the general incompetence of the organisation.

I have written to the Prime Minister on a personal basis as an amateur, pointing out that since the new Government is anxious to cut costs and believes in free enterprise, and the PMG has proved incapable of either running the examinations or doing anything about the mass of illegal operators who have virtually taken over the 11 metre band, that the amateurs should be appointed on a voluntary basis to run their own affairs. A similar arrangement has worked well enough in America for many years as far as the novice licences are concerned.

I would strongly urge every interested amateur to write a similar letter. The economy drive of the Government and the impasse over the examinations and the chaos on the 11 metre band gives us a unique opportunity to get rid, once and for all, of official incompetence and bumbledom.

Yours faithfully,
Roy Hartkopf VK3AOK.

The Editor,
Dear Sir,

I would like to raise a couple of ideas for consideration by Amateurs in general, and perhaps the WIA Executive in particular. These are:—

(1) With due regard to the already complex nature of the regulations governing Amateur Licences, and the administrative problems of the controlling authority, would it be possible for Limited Licence holders ("Z" calls) to use CW on the 2 metre band? Perhaps by passing the Novice Morse exam, we could have our licences endorsed accordingly, and be able to use F2 transmissions on one of the secondary simplex channels.

(2) Would it be worthwhile publishing a pamphlet containing stories of amateur involvement in the Darwin disaster, the Brisbane flood etc., and a general explanation of amateur radio. This pamphlet could then be made available for distribution to the public at amateur radio displays (of which there probably should be more), at Agricultural Shows etc. This may help to dispel the public view of a bunch of crack-pots who spend a lot of money duplicating the public telephone system.

(3) With reference to the articles "Amateurs assist in Air Race" (AR Oct. '73), and "1973 Red Cross Murray River Marathon" (AR April '74), is it feasible to extend this type of activity? That is, would it be possible to suggest to the Licensing Authority that we could supply voluntary communications facilities to non-profit, outdoor hobby type organisations, to the benefit of all concerned.

I hope that these ideas might provoke some comment from other Amateurs, and the WIA Executive as well.

Ian Tinney VK4ZIT.

(1) The Executive has made many attempts, without success so far, for Limited Licences to use CW on their frequencies. This has been very relevant in relation to satellite repeater users.

(2) A useful brief explanation of Amateur Radio appeared on p.5 of AR July '75. A publicity package for use in amateur radio displays was discussed at the 1975 Federal Convention — see p.28 AR June '75.

(3) This will doubtless be noted by Divisions.

Thanks for a thoughtful, helpful letter. — Ed. ■

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA, 5152

ADDITIONS TO COUNTRIES LIST

TUVALU — VR8

On 1/1/1976 an administrative separation was made in what was the Gilbert and Ellice colony. The Ellice Islands will become a Crown Colony, completely separate and no longer a part of the Gilbert and Ellice Colony. The name will be known as Tuvalu. The prefix for stations operating from Tuvalu will be VR8. DXCC credits for Tuvalu will be for contacts made 1/1/1976 or after.

OH SERIES — FINLAND

- The series of awards is available to licensed amateurs except those in Finland.
- Contacts on and after 10/6/1947 are valid.
- Do not send QSL cards. A list, showing the call signs in call area and alphabetical order should be certified by a club, official, two amateurs or a notary public.
- Awards are issued for all CW, All Phone, and mixed modes.
- The fee for OHA, OH-100 and OH-300 is 5 IRCs. There is no fee for OH500.

The address for application is:
SRAL,
Awards Manager,
Post Box 306
SF 00101 Helsinki 10, Finland.

Notes — Finnish Maritime Mobile stations do not count. "Different stations" (see below). Care should be taken to ensure that stations are not duplicated when counting. OH2AD, OH2AD/1 and OH2AD/0 are the same station. The rules regarding duplication should be read carefully.

The following stations count as OH 9 if contacted BEFORE 1/6/1954: OH2ND NJ NS NV NX OA OB OC OD OE OF OH OI OJ OK OL OM ON OX OZ PA PB PD PF PL PM AND OH6FO.

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is the time to order
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76

callbook

Don't wait until 1976 is half over. Get your new **Callbooks** now and have a full year of the most up-to-date QSL information available anywhere.

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and BANKSTOWN
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tel: 705 6501

VHF Mobile/Base Station FT620B 6 Meter Transceiver



PRICE \$468
(Incl. Calibrator &
AM Filter)

TECHNICAL DATA

GENERAL

Frequency Range: 50.0-50.5 MHz, 50.5-51.0 MHz, 51.0-51.5 MHz, 51.5-52.0 MHz, 52.0-52.5 MHz, 52.5-53.0 MHz, 53.0-53.5 MHz and 53.5-54.0 MHz. (For 50.0-52.0 MHz crystals are optional).

Mode: Selectable USB, LSB, CW or AM.

Frequency Stability: Within 100 Hz during any 30 minute period after warm-up. Not more than 100 Hz with 10% line voltage variation.

Calibration Accuracy: 2 kHz maximum after 100 kHz calibration.

Backlash: Not more than 50 Hz.

Antenna Impedance: 50 ohm unbalanced nominal. **Circuitry:** 35 Transistors, 7 FET, 2 Integrated Circuits and 40 diodes.

Power Requirement: 100/110/117/200/220/234V AC, 50/60 Hz, 60 watts maximum, or 13.5V DC nominal, 0.3 A for receive and 2 A for transmit. **Size:** 280 (W) x 125 (H) x 295 (D) mm. **Weight:** 8 kg.

RECEIVER

Sensitivity: 0.5 µV for 10 dB Noise plus Signal to Noise Ratio on SSB and CW, 1 µV on AM.

Selectivity: 2.5 kHz nominal band-width at 6 dB down, 4.1 kHz at 60 dB down on SSB and CW, 6 kHz nominal bandwidth at 6 dB down, 10 kHz at 60 dB down on AM.

Harmonic and Other Spurious Response: Image Rejection better than 60 dB, Internal Spurious Signal below 1 µV equivalent to antenna input.

Automatic Gain Control: AGC threshold nominal 1 µV. Attack time 5 millisecond and release time 1.5 seconds.

Audio Noise Level: Not less than 40 dB below 1 watt.

Audio Output: 2 watts to internal or external speaker at 4 ohm impedance.

Audio Distortion: Less than 10% at 2 watts output.

TRANSMITTER

Input Power: 24 watts PEP on SSB, 20 watts on CW at 50% duty cycle and 8 watts on AM.

Microphone: 50 K ohm dynamic type.

Carrier Suppression: -40 dB.

Sideband Suppression: -40 dB.

Spurious Radiation: -60 dB.

Distortion Products: -25 dB.

Frequency Response: 350 to 2700 Hz.

PRICES INCLUDE S.T. ALLOW 50c PER \$100 INSURANCE (Min. 50c) FREIGHT EXTRA. PRICES AND SPECS SUBJECT TO CHANGE.



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STEPHEN KUHIL, P.O. Box 56, Mascot, 2020 867 1650, AH 371 5445
W. E. BRODIE, 23 Dalrymple Street, Seven Hills, 2147 Ph. 624 2691
FARMERS RADIO PTY. LTD., 257 Angus St., Adelaide, 5000 Ph. 223 1288
H. R. PRIDE, 26 Lockhart Street, Camo, 6152 Ph. 60 4379

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NEW

NEW

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ELECTRIC GUITAR AMPLIFIER HANDBOOK (Jack Darr)	\$10.20
TRANSISTOR SUBSTITUTION HANDBOOK (The Howard W. Sams Engineering Staff). Fifteenth Edition	\$5.75
IC OP-AMP COOKBOOK (Walter G. Jung)	\$16.60
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"The G.P.O. is opposite"

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Requirements:

OHA — The applicants from non-European countries need 15 DIFFERENT OH stations in at least 5 call areas. Contacts on 3.5 MHz count double points.

OH-100 — The applicant (whatever location) needs 100 DIFFERENT OH stations, including all 10 call areas on each of TWO bands. In order to meet the CALL AREA requirement the same station may be worked on different bands. In this case, extra stations may be worked to bring the total to 100 DIFFERENT Stations.

OH-300 — The applicant needs 300 DIFFERENT OH stations, including all 10 call areas on THREE bands. In order to meet the CALL AREA requirement the same station may be worked on different bands. In this case, extra stations must be worked to bring the total to 300 DIFFERENT stations.

OH-500 — This award is given for working 500 DIFFERENT OH stations regardless of time/band/mode.

HEC AWARD — HOLLAND

- The award is available to shortwave listeners.
- QSL cards dated on or after 1/6/1945 are valid.
- Do not send QSL cards. A list showing full details of the stations heard should be certified by the Awards Manager of a National Society.
- The fee for the award is 7 IRCs.

The address for applications is:
Traffic Bureau VERON C/o PAAAC
Post Box 1166
Arnhem, Holland.

Requirements — Confirmed reception of 15 different European countries.

LISTENERS CENTURY CLUB

1-5 same as for the HEC Award.

Requirements — Confirmed reception is required of 100 different FAP/1 stations.

PROJECT AUSTRALIS

With DAVID HULL VK3ZDH

Australia has now received copies of the revised ARRL space science involvement curriculum for schools etc., and would be pleased to send a copy to educational institutions interested. Please write under school letterhead to the call book address of VK3ZDH. At the moment we have about a dozen copies on hand. There will be some delay when these are exhausted.

Difficulties with advanced orbit predictions for AR etc., have now been resolved with the acquisition of an ASR-33 model teletype at VK3ZDH allowing my computer (microprocessor actually) to calculate, and print, all requirements. The programs are available on request for anybody also using an Intel 8086.

MARCH PREDICTIONS

OSCAR 6				OSCAR 7			
Date	Time	Z	W	Date	Time	Z	W
15	15432	01.05	70.45	2	5905	00.50	62.34
2	15444	00.55	55.45	2	5918	01.44	75.96
3	15457	01.00	69.20	3	5930	00.43	60.84
4	15469	00.50	54.20	4	5943	01.38	74.46
5	15482	00.54	67.95	5	5955	00.37	59.34
6	15495	01.49	61.70	6	5968	01.31	72.96
7	15507	00.49	66.70	7	5980	00.30	57.84
8	15519	01.44	80.45	8	5993	01.25	71.48
9	15532	00.44	65.45	9	6005	00.24	56.34
10	15545	01.39	79.20	10	6018	01.18	69.96
11	15557	00.39	64.20	11	6030	00.18	58.84
12	15570	01.34	77.95	12	6043	01.12	68.46
13	15582	00.34	62.95	13	6055	00.11	53.34
14	15595	01.29	75.70	14	6068	01.06	66.96
15	15607	00.29	61.70	15	6080	00.05	51.84
16	15620	01.24	75.45	16	6093	00.59	65.46
17	15632	00.24	60.45	17	6106	01.53	79.08
18	15645	01.18	74.20	18	6118	00.53	63.96
19	15657	00.18	59.20	19	6131	01.47	77.58
20	15670	00.13	72.95	20	6143	00.46	62.46
21	15682	00.09	67.95	21	6156	01.41	76.08
22	15695	01.08	71.70	22	6168	00.40	60.96
23	15707	00.08	56.70	23	6181	01.34	74.58
24	15720	01.03	70.45	24	6193	00.34	59.46
25	15732	00.03	55.45	25	6206	01.28	73.08
26	15745	00.58	69.20	26	6218	00.27	57.96
27	15758	01.53	82.95	27	6231	01.21	71.58

28	15770	00.53	67.95	28	6243	00.21	56.46
29	15783	01.48	81.70	29	6256	01.15	70.08
30	15795	00.48	66.70	30	6268	01.01	64.96
31	15808	01.43	80.45	31	6281	01.09	68.58

APRIL PREDICTIONS

1	15820	01.43	65.35	1	6293	00.08	52.04
2	15833	01.37	79.10	2	6306	01.03	65.66
3	15845	00.37	64.10	3	6318	00.02	55.54
4	15858	01.32	77.85	4	6331	00.56	61.16
5	15870	00.32	62.85	5	6344	01.51	77.78
6	15883	01.27	76.60	6	6356	00.50	66.66
7	15895	00.27	61.60	7	6369	01.44	78.28
8	15908	01.22	75.35	8	6381	00.44	61.16
9	15920	00.22	50.35	9	6394	01.38	74.78
10	15933	01.17	74.10	10	6406	00.37	59.66
11	15945	00.17	59.10	11	6419	01.31	73.28
12	15958	01.12	72.85	12	6431	00.31	58.16
13	15970	00.12	57.85	13	6444	01.25	71.78
14	15983	01.07	71.60	14	6456	00.24	56.66
15	15995	00.06	56.60	15	6469	01.19	70.28
16	16008	01.01	70.35	16	6481	00.18	55.16
17	16020	00.01	55.35	17	6494	01.12	68.78
18	16033	00.56	69.10	18	6506	01.12	53.66
19	16046	01.51	82.85	19	6519	01.06	67.28
20	16058	00.51	67.85	20	6531	00.05	52.16
21	16071	01.46	81.60	21	6544	00.59	65.78
22	16083	00.46	66.60	22	6557	01.54	79.40
23	16096	01.41	80.35	23	6569	00.53	64.28
24	16109	00.41	65.35	24	6582	01.47	77.90
25	16121	01.36	79.10	25	6594	00.47	62.78
26	16133	00.36	64.10	26	6607	01.41	76.40
27	16146	01.31	77.85	27	6619	00.40	61.28
28	16158	00.31	62.85	28	6632	01.34	74.90
29	16171	01.25	76.60	29	6644	00.34	59.78
30	16183	00.25	61.60	30	6657	01.28	73.40

20 Years Ago

with Ron Fisher VK3OM

MARCH, 1956

How often should the Federal Conventions be held. It appears that money was rather short in 1956 and it was decided that, "Annual Conventions were an unnecessary financial drain on the Division, Council therefore resolved that the next convention would not be held until business was of sufficient importance to warrant the expense".

An experiment that appears to be unique in Australian amateur history was described by Pearce Healy VK2APQ. Four walkie-talkies and one mobile unit operating in the 144 MHz band were used to test communication in the Jentolan area. Apparently good results were obtained and, when one considers the equipment used, were perhaps remarkable. The portable units ran all of 4 watt input and used super-regen superhet receivers. I wonder if any similar tests have been conducted in the intervening twenty years. With the portable gear available today perhaps some interesting comparisons could be made.

Ron Henderson VK3ARV described how he had "Bandspread" the Super-Pro on all bands. The Super-Pro was of course the Australian made version, the AMR 200. These were made in Melbourne by the Radio Company. Only a very few were actually factory built and sold. The intention was to dispose the market to enable many amateurs to build their own set up. The original band spread system did not operate on the 80 metre band and provided a bit too much on the other bands. Ron covered the answers.

Phil Williams VK5ZAD (that name sounds familiar) described his low loss antenna switching system. VHF and UHF. He also described VK2AZD presented further notes on his transmitter with low harmonic output. Ron Fisher VK3OM (sounds familiar too) described his 40 metre mobile transmitter and centre loaded whip antenna. A rather mathematical article on transformer theory and practice by J. McMillan VK2AWN rounded out a very interesting issue.

QSP

ARRL DXCC

Looking through the hundreds who are listed in QST for Dec '75 as having submitted confirmations for contacts with 300 or more countries the top most is 355 countries. Only two VK's appear in the list — VK4QM with 351 and VK3YL with 314 — of those with 300 or more.

DO NOT FORGET
THE RADIO AMATEURS'

OLD TIMERS DINNER

Wed., 10th March,
1976

from 18.00 h at

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Ph. (03) 20 7780 A.H.

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- Eight lines free to all WIA members. \$9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

FOR SALE

Swan 350 with 230V power supply and speaker, 5 bands incl. vol 28-29.7 MHz. Exc. cond., good performer, little used, \$300. Accept Oscilloscope as part. Want "Antenna Handbook" (Glanzer) Vol. 2, 3, VK2KR, QTHR, Ph. (02) 449 4524.

One Heathkit HR-10 Rx, complete speaker spares valves manual, \$100. M. Wright, P.B. 72, St. Arnaud, Ph. (054) 95 1579.

Carphone MR10A, 2-channel, good condition and re-valved, operating on 2m, Ch. A crystals. VK3ZKS, QTHR, Ph. (03) 38 6793.

Swan 350 Transceiver with AC PSU, mike and plug in VOK \$250. BG1421 VHF Rx, 100 to 150 MHz, \$80. Bendix frequency meter with AC and DC power supplies, \$25. Acronix heavy duty mobile PSU, suit transceivers, \$80. EA digital counter 200 MHz, \$75. VK2BDA, QTHR.

Hi-Fi 30 W Stereo Amp., solid state with scratch and rumble filters, includes tuner, tape, xtal/mic switching, \$40 o.n.o. VK3ZCR, QTHR, Ph. 89 4645 A.H.

Collins KWC 2A Tcr, w/AC supply, new late model, Drake Rac Rx T4XC Tx w/AC supply, new 2 metre FM IGT2A w/digital VFO, 02V1, new Ph. (03) 24 1231, A.H. (03) 20 6135.

TC1A75, with 4 ch. switch, Ch. 40, 50 and R4 fitted, complete with mic, circuits and infor. Works well, \$70. Also 11m rig B5060, operates AC mains or 12V DC, has 27.065, 27.085 and 27.125 MHz xtals, new and complete in original packing, \$80. VK2HS, 9 Moore Cres., Faulconbridge, 2776.

HAMADS — continued

Yaesu FT501 with FFS01 power supply complete, purchased September 1974. As new condition, \$500. Genuine reason for selling. VK2QW, QTHR, Ph. (06) 82 2003.

Valves new QOE64/40, \$10 ea. QOE03/20, \$8 ea. D37-36 CRO tube, \$5.00. VK13 144 MHz converter \$8. 6-9 Command Rx with power supply, \$10. VK2BWH, QTHR, Ph. (02) 667 2291.

Yaesu FLDX40, 80-10m Tx, excellent cond., orig. pkg., with mic, manual and connecting cables, \$300 o.n.o. Allan Mason VK2GR, QTHR, Ph. (02) 47 4344.

I.G.L. 2m FM Transceivers (2) in excellent condition, both 12W solid state in 2" x 8 1/2" x 8 1/2" extruded aluminium cases with xtal and circuits. One 5 W 12W \$130, the other single channel, \$110. Brian VK2ZOW, QTHR, Ph. (02) 452 1257.

Gonset GSB100 Tx 10/60m, mint cond., drive any Linear CW manual \$100. Homebrew Linear G2 811As, with B & W turret (HD) AC filter, meter, 2 DC mA meters, \$100, 10/60m. Pair Selsen motors \$10. Heath type VTTM \$20. Transpro VCT \$40. Asahi mobile ant. 10m, 15m, 20m, 40m, 80m, CW ball seal and spring, mint cond., new price \$108, sell \$75. Heath DX60 Tx \$30, VK2DA, QTHR, Ph. (02) 94 1039.

FT DX 401, mint condition with microphone and matching speaker. Bought new August 1974, \$400 or deal for FT101B. VK4UJ, QTHR, Ph. (07) 33 1381.

Communications Rx, model QRB66, range 170 kHz to 30 MHz, in 6 bands, press button operation for AM-ANL-CW/SSB/SEL, BFO control for LSB/USB, plus S meter, use for AC/DC with service manual, new in box \$260. Contact J. C. van Ooijen, Phone A.H. (03) 699 2400, P.O. Box 141, St. Kilda West, 2182.

I.G.L. 2m FM 1W Exciter and Speech Amp. New, complete, \$30 o.n.o. VHF Rx Halliçaters with man., \$30, 40 and 80m converters with xtal, \$10 each. 6 over 6 skeleton slot 2m Yagi, \$15. 5 el. 2m Yagi, \$8. 2m corner reflector, \$15. AR2 2m Ringo with extension (as new), \$30. 6m 3 el. Yagi (as new), \$30. BTR6 2m FM mini base Ch. 1 and Ch. B, \$35. MTR12 6 AM mini base, \$25. 5 el. Yagi Ch. 6 AM 4 ch. inc. \$53.02, MTR12 6 AM semi-cond. 032 xtal, \$20. Also 6 + 2m AM Tx and converters, \$30 lot. STC 1674 6 FM base, 6/40 final with xtal, \$40. Many more bits and pieces. Rob McNabb VK3YBC, QTHR, Ph. (03) 630 7631 or A.H. (03) 232 9237.

MR20B FM Transceiver, converted to 52.525 MHz, mint condition, \$45. MR10B channel B, all new tubes, VFT 300 amp, HW22 Heathkit 20m SSB transceiver, \$100. All with circuits etc. 6m AM Carphone 12V 10W, xtal locked x unit, timeable Rx 52-54 Mc/s with crystals, excellent performer \$15. Hills 50 1/2 ft. five section tubular telegraphic antenna mast \$40. VK3CQD Lloyd Davies, 311 9199 B.H., 7/35 Pine Ave., Elwood, Vic., 3184.

FT200 Transceiver (just overhauled), plus AC supply, plus action DC DC supply, plus spare PA valves (new) \$380. VK2KI, QTHR, Ph. (02) 78 4237.

6 Metre Converter, 3 tubes, commercial robust construction, no PS \$25. Command Rx 7-9 MHz, exc. cond., no mods., good condition \$25. Command Tx 7-9 MHz, original, no PS on original chassis \$30. Command Tx 3.5 MHz, cond., with one 1625 as mod., \$20. Vye Reporter AM with \$3.092 xtal, Rx var. tuning, 12V DC/AC 20, Rx faulty. AWA FM Carphone 60-85 MHz, VIB P/s, good clean, complete with cables, handset and control unit and hand-book \$25. As above, Rx faulty, no hand-book \$15. VK4LN, QTHR, Ph. (071) 82 2675.

Swan 350 U and L Sideband 100 kHz xtal calibrator, AC PSU, \$300. Also late model Swan SW-240 U and L sideband, 12V neg. earth PSU, \$175. Both in good condition with manuals. PSU are inter changeable. Opportunity purchase much sought after no nonsense transceivers, will consider offer for both TRX. VK2OR, QTHR, Ph. (02) 66 4558.

Heathkit VFO model VFU 160-100 (England), with handbook, new and used cond., no P/s \$30. Bandix BC 348 Rx 1.8-18 MHz, 200 to 500 kHz, built in P/s, no speaker (no SSB), BFO needs attention \$45. T12 D Trans., 100W AM output 807s ARL, mod. 807s, B/SW, 80/40/25/10, 2 VFOs, no P/s \$25. Swan 240 P/s, VK4L, 300/100/12 V AC, 12V DC, with speaker, exc. cond. \$40. Western electric audio amp., 100W, unit consists 3 amp. and monitor works from 110V all "Western" metering, in rack, wt. 200 lbs. \$50 o.n.o. Barlow Wadley Rx XCR-30, mint cond., hand-book and service manual \$200. Galaxy V, excellent cond., VOK, calib., P/s, 240V clean with hand-book \$350. VK4LN, QTHR, Ph. (071) 82 2675.

FT/FP 200, in excellent condition, complete with desk mike and manual \$345. VK3BHN, Ph. (03) 467 2131 Bus.

Creed 7B Teleprinter, answer back and sound proof wooden cabinet, VGC \$65. VHF Tx Rx type ARC1 and matching rack \$35. W. Babbs VK3AQB, Ph. (03) 337 4902.

FT DX 401, 80-10m metres, 560 watts, CW filter, noise blanker, etc., little used, mint condition in original carton, complete with matching speaker, desk microphone, also headphone, \$445 o.n.o. VK3ARZ, QTHR, Ph. (03) 232 9482 A.H.

RTTY all excellent A1 condition, Creed 7B page printer, Creed typing Repertory, Mainline TJJ, CRO, stroke, balance meter, rolls of tape and paper. The lot for \$170 net. I need the room! Collect at VK3YS, QTHR, Ph. (03) 89 2213.

KW2000A transceiver, 1600 to 10m, complete with mic, AC and DC power supplies. Recently revalved, \$350. VK3ML, QTHR.

FT75, TCR, FPTS AC PSU, FV500 VFO and home brew digital dial in matching case. Dial also useable as a digital freq. meter to 20 MHz with accuracy at 1 or 0.1 kHz. \$360 o.n.o. Neil Osborne VK3YE, QTHR, Ph. (03) 24 0331 bus., (03) 763 0256 A.H.

WANTED

Heliax or similar low loss coax cable 75 to 100 ft., 3/8"-1/2", 50 ohms type preferred. Max Ripier, VK2DT, 2 Patya Close, Epping, N.S.W., 2121, Ph. (02) 668 1131.

Any old radio, gramophones, or parts thereof, up to the early 1930s. Also can anyone help me with information on Marconi Spark transmitter/receiver used by the Army as a portable field set. Max Ripier, VK2DT, 2 Patya Close, Epping, N.S.W., 2121, Ph. (02) 668 1131.

Transceivers — 6m, 2m, 70 cm to suit FT101, also helical or toroid verticals anywhere in (16-50) m. Bob Boyer VK2KAC, Ph. (02) 646 0317 (res).

Electron Tubes, type 446A, 464, 2C39, 2C40, 2C42, 2C43, 2C46, RL18, 955 or any VHF UHF type tubes, including Klystrons and magnetrons. I am also interested in obtaining old UHF Rx's and Tx's. R. Sugden VK2ZHS, QTHR, Ph. (02) 59 5390 A.H., (02) 82 6051 Bus.

Tuning GAG, gearing and etchout panel for BC348 or BC222 or buy incomplete set. Command Rx top and bottom covers plus output transformers. W. Babbs VK3AQB, Ph. (03) 337 4902.

Vertical all band antenna of good order. M. Wright, P.B. 72, St. Arnaud, Ph. (054) 95 1579.

Collins 30L-1 Linear Amp. Pay top price for mint unit. A. C. Hawker, Box 35, Dimboola, Vic., 3414.

Private collector interested in old time commercial cinema material as well as old time radio and TV transcriptions. Interested in exchanging taped broadcast tape material. Thomas King, VK2ATJ, P.O. Box 45, Kensington, N.S.W., 2033.

Any surplus as BC342, 348, 314 ROs, SX8s, AR88 Command sets, also Tx etc. Also tower, hills or similar, VK5QO, QTHR.

Stolle Antenna Rotator, in good condition. Contact J. Cordingley, 41 Jillico Avenue, Tallangatta, 3700.

Manual for ATS, AHR, to buy or to borrow. W. Smith, 17 Crewick Street, Glen Iris, Ph. (03) 20 3456.

Silent Keys

It is with deep regret that we record the passing of—

VK2ABZ

WILLIAM FREDERICK BARDIN, 1899-1976
The passing of Bill Bardin has broken yet another link joining Amateur Radio of today with the early days of wireless communication as it was known.

When still a youth Bill passed through the Marconi School of Wireless then joined the Queensland Radio Service where he served for five years at the same time operating amateur station 4AB. In turn he served as engineer at broadcasting stations 4BH, 4QG and 4BC. It was whilst Bill was operating in Queensland that the contest for "Old Bills" Cup Trophy for amateur competition was started — it would be interesting to know who now has this trophy.

Prior to World War Two Bill Bardin joined A.W.A. and, when Japanese invaders were rapidly advancing southwards, was sent to New Guinea to dismantle Government radio installations and arrange for their return to Australia — after the war it was Bill's first job to take all back and organise re-installation.

Bill, a foundation member of the MIRE, then transferred to the N.S.W. branch of the QTC where he served until his retirement. After a long illness Bill mercifully passed away, survived by a son and daughter — who have the deepest sympathy from all who knew Bill. — VK2CE.

VK4JW HERB LARSEN

With the passing of Herb Larsen on January 13th last, amateur radio has lost another old timer, something that will be regretted by many amateurs. Herbert Peter Christian Larsen was born in Charters Towers in April 1901. After 20 years when employed in Cairns, he had spent his lifetime at Charters Towers, also serving 14 months with the Australian Military Forces in 1942-43 before being discharged on medical grounds. Herb became interested in radio when in his early 20s, homebrewing vacuum couplers and later regenerative valve receivers for broadcast reception, long before the official commencement of broadcasting in Australia. In March 1928, he secured his Amateur Licence VK4JW, then followed an active association with amateur radio until a few days before his passing.

Being one of nature's gentlemen, Herb will be missed by a large circle of personal friends and a larger group of amateur friends. — VK4LK.

Theosophists, or similarly-inclined, Tom House, BA, VK2BTH, would welcome hearing from you. Skeds, preferably CW, eyeball QSOs or correspondence. 34 Wolsley Road, Lindfield, 2070, Ph. 467 2773.

Wanted for a new SWL Gelsos Amateur Band Receiver, Model G4/216. Price and relevant details to Laurie Bates, Box 1, Rokewood Junction, Victoria, 3351.

Potential Amateurs with disabilities for novice/AOCP day classes forming now at the Disabled Radio Amateurs Club VK3ZZ in South Melbourne. The building is easily accessible. For application form ring Rod Bishop, Secretary/Treasurer, Ph. (03) 92 4591, 7 p.m. to 9 p.m.

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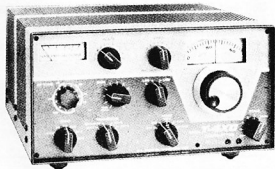
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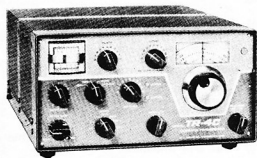
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